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ABSTRACT

This document contains 35 papers: "Distance Education with a Human Face" (Holmberg); "Time Is Money and Vice Versa: Reflections on Using Satellite Delivery to Improve Cycle Time and Quality" (Robinson); "Distance Education: Consolidating the Gains" (Grossman); "The Human Resource Imperative" (Atkinson); "Developing Short Courses for Business and Industry" (Kryczka); "Hypertext" (Kearsley); "Site Coordination and Support Services" (Roberts, Harvey-Foulds); "Coordinating the Use of Cable Technology in Oakland County, Michigan" (O'Donnell, Gholz); "Telecommunications Instructional Consortium" (Blakesley, Regnier); "How to Develop Successful and Profitable Adult Education Certificate Programs" (Hoyle); "India's Experience with Distance Higher Education: Indira Gandhi National Open University" (Miller); Supporting Individual Learners at a Distance" (Granger); "The Soft Touch in Distant Education" (Behm, Molise, Threlkeld); "Evaluation of Learner Support Services in a Distance Education System" (Dillon, Gunawardena, Parker); "Supporting Distance Learners" (Keir, Ward); "Assessing Adult Learning Strategies" (Fellenz); "Goal Accomplishment Style and the Long Distance Learner" (Atman); "Strategic Education: Distance Learning for Business Needs" (Beutel, Go); "Application of Instructional Television in a Farm Training Program at Northcentral Technical College" (Doenier); "Distance Education through Interactive Television: Is It Effective?" (Egan, Page); "Effectiveness of Interactive Satellite Delivery Versus Traditional Delivery in Selected Courses" (Douglas); "Various Uses by Instructors of PC-Based Audiographic Teleconferencing Technologies" (Gilcher); "Computer Conferencing and the Distance Learner" (Romiszowski, Jost); "Developing Hypermedia for the Learning Environment" (LeGrand, Mehler); "Level Two Interactive LaserDisc" (Lookatch); "Moving Independent Study into the 1990s" (Holman); "Bridging the Gap: Building a Sense of Community for Graduate Students at a Distance" (Mitcham); "International Business Negotiation Simulations" (Rawson); "Instructional Strategies, Distance Education, and Student Involvement" (Dillon, Hengst, Zoller); "Self-Directed Learning Readiness in Distance Education" (Harring-Hendon); "Instructional Design Considerations in the Development of Computer-Assisted

Interactive Video" (Gunawardena, Saito); "Designing a Teleclass Instructor's Workshop Addressing the Differential Skills Needed for Quality Teleclass Teaching" (Cyrs); "Application of an Audio Computer Graphics System to Distance Education in a Baccalaureate Nursing Program" (Bollinger, Danou, Maddox); "Producing Telecourses for Adult Distance Learners" (Purdy); and "Toward Sustainable Improvements in Accessibility and Quality" (Ehrmann). (CML)

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Fifth Annual Conference on Teaching at a Distance

Helping Learners Learn at a Distance

Madison, Wisconsin

August 8-10, 1989

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Fifth Annual Conference on Teaching at a Distance

HELPING LEARNERS LEARN AT A DISTANCE

Madison, Wisconsin
August 8-10, 1989

The Fifth Annual Conference on Teaching at a Distance, held in Madison on August 8-10, 1989, brought together a record 315 participants from across the United States and other countries--Canada, Mexico, Venezuela, Indonesia and West Germany. The program included nearly 40 general and informational sessions as well as half-day seminars, tours/workshops and displays.

The conference theme, "Helping Learners Learn at a Distance," focused on the essence of our enterprise--the learner. Just before the conference, I happened to pick up Athabasca University's calendar of several years ago and read on its cover the following: "Athabasca University is dedicated to the removal of barriers that traditionally restrict access to and success in university-level studies..." That line struck a chord.

How many of us, particularly those of us who administered distance education programs in the 1970s, found ourselves saying that access to education is important? We argued: (1) taypayers should have access to the education they pay for; (2) employees need access to training; (3) K-12 youth need access to unique courses and teachers; (4) health care professionals need access to programs required for licensure; and so forth. We all recognize the litany.

The fight has been long and hard to ensure access through distance education. For want of a better term, we have fought in large measure for physical access. Getting the "word" to the learner. The conference theme, "Helping Learners Learn at a Distance," focuses on what one might term psychological access. Helping learners to acquire, experience and explore educational offerings in order to examine themselves and their worlds and to grow personally and professionally. Hopefully, as we increase our understanding of distance learning, we can move beyond access to towards success in and from physical access to psychological access.

In the conference papers contained in this proceedings, the authors relate their experience and perspectives on learner-oriented applications in distance education. Included are the topic areas of program development, learner support, instructional design, program effectiveness and teaching/training approaches.

The proceedings contains 35 papers--5 from the general sessions and 30 from the informational sessions or seminars. Among the general session papers are three keynote addresses by Borje Holmberg, director of the Institute for Research into Distance Education at FernUniversitat (the German Open University); John Robinson, manager of external relations at Motorola Training and Education Center; and David Grossman, associate dean of continuing education and extension at the University of Minnesota.

Reactor panel discussions following the keynotes by Drs. Holmberg and Grossman are available on audiotape. An order form is provided at the back of this book if you wish to purchase audiotapes of the panel discussions or other general sessions.

On behalf of the Conference Planning Committee, I wish to thank the authors for contributing papers for inclusion in the proceedings and for helping to increase knowledge about learning at a distance.

Chere C. Gibson
Assistant Professor
University of Wisconsin-Madison

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DISTANCE EDUCATION WITH A HUMAN FACE

Presentation at the
5th Annual Conference on Teaching At A Distance
August 8-10, 1989
Madison, Wisconsin
U.S.A.

Presented by
Borje Holmberg
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It is a commonplace today that distance education caters for effective learning. The success stories of big distance-teaching organisations (like the British Open University) are well known. Distance educators make much and usually sensible use of modern media and information technology, the distance-teaching administration is, as a rule, flexible and efficient. Much could be said about the achievements of distance education, but I won't go into that but rather point out that there are snags that are not always given due attention. The basic problem is, as I see it, a danger that by a depersonalised product and neutral interaction we may stifle students' motivation or, in any case, neglect to support it - and that is a serious allegation.

Academic concerns

It is, I believe, important to realise that education is more than information transfer, that, in fact, it is concerned with the intellectual and emotional development of students. How do we meet this challenge?

Both distance educators and students are often fond of entirely self-contained courses, i.e. courses that contain everything students need so that they can avoid time-consuming consultation of books, articles and data bases. These courses are felt to be very effective. It is possible but - I am afraid - not very common that by means of such courses students are engaged in individual considerations that make them scrutinise arguments and generally make them think so that they can come to positions of their own. But there is a great risk involved. A self-contained course can easily become autocratic, telling students not only what to do but what conclusions are the proper ones, thus depriving them of the exercise of their own criticism and judgement. Ways out of this difficulty have been found, but the problem does not seem to have been given the attention it requires.

The first step on the way towards more academic types of study is to develop courses functioning as study guides to set texts, which consist of papers and extracts from books through which students get into direct contact with authoritative specialist writings. Such texts are usually reproduced in so-called readers. While this is a practical and, from the students' points of view, time-saving procedure, it evidently limits their choice of literature. Sometimes, particularly in Australia, where copyright conditions seem to favour distance education (L. Moore 1987 p. 26), photocopies of new contributions to learned journals are also distributed to students.

Only the use of well-equipped libraries can offer better solutions. Providing library services for distant students is no easy matter; pioneering work here has been done in Australia, e.g. at Deakin University (Winter & Cameron 1983).

Further steps on the same path cause project work of different kinds to be used in distance education. While this type of work requires excellent library services and availability of highly competent supervisors, there is much evidence to show its effectiveness in distance study at the university level (cf Bynner 1986 and his sources on post-graduate distance study).

These endeavours to render distance education as 'academic' as conventional university education evidently coincide with attempts to make students as autonomous as possible. Some basic research on student autonomy in distance education that should be mentioned has been done by Michael Moore, who has shown that autonomous persons are particularly attracted to distant methods of learning and teaching, although it has also been found that distant students do not reject guidance (M. Moore 1976).

In an interesting staff-development course for university lecturers leading to a degree in education Lewis Elton and his co-workers at the University of Surrey in England have managed to cater for far-reaching student autonomy by 'presenting material in a general manner and expecting course members to relate this to their own experience and current work' (Elton, Oliver & Wray 1986 p. 30). As it was impossible to create a course directly relevant to all participants, a course was developed which, I quote, 'each member could make directly relevant to his own experience. To do this, we kept the course purposely general, but expected participants in each assignment which they submitted to relate the general to their particular experience' (ibid.).

This approach proved successful and can be regarded as a prototype of autonomy-supporting and autonomy-expecting academic distance teaching (cf. Holmberg 1986 pp. 87-94). It should be noted that the flexible individualisation allowing students largely to decide on their own on the study content in this case serves staff development rather than the study of a discipline as such. Whether there need be a conflict in this respect between the two types of study is probably a contentious issue.

Of particular interest are present trends to combine distance education with so-called contract learning, in which individual tutoring is based on the study of literature agreed between the professor and the individual students. Recent developments along this line occur in the contract learning initiated by Empire

State College, N.Y. (cf. Coughlan 1980, Worth 1982), in a diploma curriculum at North East London Polytechnic (Bradbury et al. 1982, Hinds 1987) and at Murdoch University in Western Australia (Marshall 1984). The individual student exerts strong influence on the objectives of his/her study. In these cases distance education is characterised not only by adaptivity to students' needs and wishes as far as time and methods are concerned. These are applications of far-reaching student independence at all levels.

It is thus evident that distance education can and does serve not only training, fact learning and the acquisition of skills, but also genuinely academic ends (which, of course, include the learning of facts and skills). The autonomy question nevertheless remains an issue of prime importance both to students and to the practice of distance education. It is at present being subjected to a careful study by Dr. Monika Weingartz of the FernUniversitat in West Germany.

An empathy approach

What I have so far said has been mainly concerned with the academic aims of distance education and what can be done to cater for them. Irrespective of these, students qua humans have personal needs we must also try to satisfy. All of us want to feel rapport with those we do important work with and we tend to require feelings of belonging. These are needs we must not neglect in distance education. We must do what we can to make distance study attractive and personally relevant to students. I refer to this as an empathy approach. With empathy is usually meant the power of projecting oneself into and understanding someone else's thinking and feeling. A certain amount of empathy in relation to students' work and situation is in my view required of all distance educators.

Basically, empathy in our context would seem to denote the capacity and readiness to experience and, as it were, personally to feel students' uncertainty, anxiety and hesitation on one hand, their confidence, intellectual pleasure and eureka sensations on the other hand and share these experiences with them. Empathy in this sense is evidently conducive to author, tutor and counsellor behaviour likely to facilitate mutual understanding and personal contact between students and their supporting organisation, which is what the university or school should be in relation to students.

Empathy in distance education implies more than understanding conducive to helping students master difficulties. I submit that in serious study most of us feel a need to share discoveries and intellectual experiences with someone else, to exchange views and through this exchange learn to work confidently with the intellectual matter concerned. This evidently implies a need for dialogue. Disregarding the face-to-face elements that in some - but not most - cases supplement distance education we must find ways non-contiguously to cater for something functioning in the way dialogue does. This is evidently necessary if we wish to pave the way for the development of empathy.

Thinking along these lines has caused some theory contributions immediately relevant to distance education. These contributions are concerned both with course development and with non-contiguous communication. Contributions by Kathleen Forsyte, Torstein Rekkedal and others belong here.

I have developed and tested a theory of didactic conversation based on the empathy approach. It can be summarised as follows:

> If a distance-study course consistently represents a communication process felt to have the character of a conversation, then the students will be more motivated and more successful than if the course studied has an impersonal textbook character.

The characteristics of this didactic conversation at a distance are taken to be

> easily accessible presentations of study matter; clear, somewhat colloquial language, in writing easily readable; moderate density of information
>
> explicit advice and suggestions to the students as to what to do and what to avoid, what to pay particular attention to and consider, with reasons provided
>
> invitations to an exchange of views, to questions, to judgements of what is to be accepted and what is to be rejected
>
> attempts to involve the student emotionally so that he or she takes a personal interest in the subject and its problems
>
> personal style including the use of the personal and possessive pronouns I, you, my, your, etc.

Didactic conversation implies more than what Lewis calls internalised conversation caused by the study of a text (Lewis 1975 p. 69). It serves the purpose of establishing a personal relationship and empathy between student and course developer.

The theory has been shown to generate three testable hypotheses relevant to the empathy concept. It was subjected to rigorous testing by means of attempts to falsify the hypotheses under adverse conditions in Popper's spirit. Three series of tests were undertaken. The students taking part in the investigation stated that they felt personally involved by the conversational presentations, their attitudes were favourable to them and they did marginally better than a control group. In spite of this the results were statistically less supportive of the theory than expected. The tendential outcome supports the theory, however (Holmberg, Schuemer & Obermeier 1982).

This theory of mine applies to course development through which a kind of simulated communication can be brought about. I should like also to mention a theory bearing on real communication in distance education. It has been developed by Torstein Rekkedal in Norway. It tests a 'new' tutor role which integrates 'the functions of administrative measures, tuition[1] and counselling' (Rekkedal 1985 p.35). Each student in Rekkedal's experimental group was given one contact person in the distance-teaching organisation. This contact person was the student's tutor, counsellor and administrator, answering questions about all matters connected with the study. Rekkedal investigated the outcome of this integration of supporting tasks, which included introductory letters in which the contact persons introduced themselves to their students, short turn-round times for assignments and frequent telephone contacts with students. The study comprised a comparison between an experimental group offered these services by a personal tutor-counsellor and a control group following the usual pattern of the school concerned (NKI in Oslo). In both cases tne study concerned 3 - 11 courses of a course combination leading to a professional qualification.

> The main difference between the treatment of the experimental group and the control group was that the experimental students communicated with one personal tutor integrating administrative, teaching and counselling functions, which normally are separated.
>
> (Rekkedal 1985 p. 9)

Statistically significant differences were found between the groups. The students in the experimental group had a higher completion rate, they were more active in their studies and completed a larger number of study units and courses during the experimental period (Rekkedal 1985 p. 13).

It seems probable that the personal contact with one representative of the supporting organisation prevents the student from feeling that he/she has to deal with a bureaucratic body and paves the way for the feelings of belonging that the empathy approach implies.

In another study Rekkedal has conclusively shown that short turn-round times of assignments, which should not exceed one week, contribute to course completion and success (Rekkedal 1983). Modern information technology can help here. If electronic mail is used, the turn-round time is limited to a maximum of 24 hours if only the tutor empties his 'telebox' and comments on the assignment replies received once a day.

---

[1] Tuition is, of course, used in its British sense here, meaning tutoring, teaching.

The data mentioned and the outcomes of the other studies referred to indicate that the empathy approach is favourable to distant students. If we believe that dialogue and human contact generally are at the core of educational endeavour we may be inclined to regard empathy not only as a desirable but as a necessary characteristic of distance education and its endeavours to serve truly academic purposes successfully.

Detailed reports on the theories presented in the lecture and the testing of them occur in the following publications:

The Holmberg theory

Holmberg, B., Schuemer, R. & Obermeier, A. (1982) *Zur Effizienz des gelenkten didaktischen Gespraches* (with a summary in English). Hagen: FernUniversitat, ZIFF

Holmberg, B. (1985) *Status and trends of distance education*. Second revised edition, pp. 26-30. Lund: Lector Publishing

Holmberg, B. (1988) Guided didactic conversation in distance education. In Sewart, D., Keegan, D. & Holmberg, B. (eds.), *Distance education. International perspectives*, 114-122. London and New York: Routledge (a re-print of a Croom Helm book of 1984)

The Rekkedal studies

Rekkedal, T. (1983), The written assignments in correspondence education. Effects of reducing turn-around time. An experimental study. (A translation of 'Innsendingsoppgavene i brevundervisningen' of 1973). *Distance Education* 4, 2, 231-252.

Rekkedal, T. (1985) *Introducing the personal tutor/counsellor in the system of distance education*.

Other works on which the lecture is based

Bradbury, Ph., Hinds, E., Humm, M. & Robbins, D. (1982), Innovations in independent study at North East London Polytechnic. In Teather, D.C.B. (ed.), *Towards the community university. Case studies of innovation and community service*, 46-48. London: Kogan Page.

Bynner, J.M. (1986), Masters teaching in education by distance methods. *Distance Education* 7, 1, 23-37.

Coughlin, R. (1980), The mentor role in individualized education at Empire State College. *Distance Education* 1, 1, 1-12.

Elton, L., Oliver, E. & Wray, M. (1986), Academic staff training at a distance - a case study. *Programmed Learning and Educational Technology* 23, 1, 29-40.

Forsythe, K. (1986), *Understanding the effectiveness of media in the learning process*. Paper presented at the World Congress on Education & Technology in Vancouver, May 1986. Victoria: Learning Systems Knowledge Network.

Hinds, E. (1987), The school for independent study and international links. *ZIFF Papier* 69. Hagen: FernUniversitat.

Holmberg, B. (1986), *Growth and structure of distance education*. London: Croom Helm.

Lewis, B.N. (1975). Conversational man. *Teaching at a Distance* 2, 68-70.

Marshall, L. (1984), *Independent study contracts*. A guide for students considering applying for independent study contracts and for staff who supervise them. Perth: Murdoch University.

Moore, L. (1987), The Australian law of copyright and its application to distance education. *Distance Education* 8, 1, 18-37.

Moore, M. (1976), *Investigation of the interaction between the cognitive style of field-independence and attitudes to independent study among adult learners who use correspondence independent study and self-directed independent study*. Unpublished doctoral dissertation. Madison: University of Wisconsin.

Popper, K. (1972), *Conjectures and refutations. The growth of scientific knowledge*. London: Routledge & Kegan Paul.

Winter, A. & Cameron, M. (1983), *External students and their libraries*. Geelong (Victoria, Australia): Deakin University.

Worth, V. (1982), Empire State College/State University of New York Center for Distance Learning. *DERG Papers* 7. Milton Keynes: The Open University.

TIME IS MONEY AND VICE VERSA: REFLECTIONS ON USING SATELLITE DELIVERY TO IMPROVE CYCLE TIME AND QUALITY

John N. Robinson
Manager, External Relations
Motorola Training and Education Center

In my talk today, I want to primarily address the question of satellite delivery, highlighting some key elements and things that are going on in the United States. First I'd like to set the stage for what is happening in the global environment before talking about some successes people are having in using satellite.

I think cultural changes are very relevant. Yesterday's USA Today--by the way it says via satellite up here in the corner of the newspaper--talked about what happened historically. This is the 20th anniversary of Woodstock. Some of you may not know what Woodstock is, some of you may think it is a little bird in a comic strip, but Woodstock was a significant change event for American society. USA Today says "Rockers Take Magic Bus to Moscow." Some of you are wondering why I would want to comment on that. Well, the magic bus is a leased 757 airplane chartered to carry all kinds of rock group technical equipment to Moscow for a concert. The groups that are performing are Bon Jovi, Motley Crue, Cinderella, The Scorpions, Skid Row, Ozzie Osborne, and three Russian bands for 200,000 Moscovites. It will be broadcast to the US live via satellite. The Public Relations people never miss a chance to push something like this, and they say, quoting, "A production this size hasn't happened since the Egyptians built the pyramids." That gives you some idea of what is being done now via satellite.

What I want to talk about first are business challenges, the challenges we face in terms of doing business. I am talking about time is money and vice versa, meaning money is time; and that is really what we are talking about here. That is really what satellite transmission, satellite technology is going to do for us. These are the challenges that we face (see transparency 1). First, cultural change is a complex challenge that many people are having difficulty dealing with. We could well spend the whole presentation on that and how cultural change affects the workforce.

The second challenge is developing partnerships, and you will notice that government is included as a place for partnership. No longer is government only an initiator of legislation and a regulator of everybody else. Now government is your partner whether you like it or not. If government is going to be your partner at all levels, make sure you use government constructively. I have a dialogue with government because, after all, it is a government of the people. That is how it was intended and you better make sure you stay in touch.

Emphasis on human capital is a third challenge. The American Society for Training and Development, in conjunction with the Department of Labor recently completed a number of studies focusing on the question of human capital in the 1990's. What's going to happen there? Human capital is very critical. People in business schools and others need to be awakened that there is human capital in addition to dollar capital, Deutsche mark capital and yen capital.

See pages 16-27 for transparencies 1-12.

The fourth challenge is plan for process. This point may not be new to people in academia, but people in business frequently have not thought much about planning for the process. They think about planning, but they don't think about process as something they do.

Most of you are familiar with the work and cultural issues listed on transparency 2. I have put this up just to remind us all that what happens at work is enormously impacted by the culture. I was at a Senate testimony a few months ago and someone from the AF of L-CIO said to a congressman who was talking about day care, that they wanted to hear about automation and things like that. She said, "as a mother, I can't be concerned about automation and workforce retraining unless I know my children are safe." Obviously she's right, but you need to tell the workplace story and make sure people understand. The workplace is going to be a very hot issue, shortly, at the legislative level in Washington.

People issues are another tough challenge (transparency 3). That's talking about human capital, of course, and change is going to be a way of life. It is very, very clear that the ability to succeed in business today is going to be the ability to stay flexible and to manage when it is chaotic. The individual will be measured as part of a team of multi-skilled problem-solvers. The next point, selection and training, also comes back to the individual. The individual is the variable in the equation. I was down at our Phoenix operation a week or two ago, where outside consultants were watching some people assembling microprocessors in white suits. It's called a clean room or white room, and people were looking through microscopes and wearing face masks. One person put the face mask aside and made a comment to a worker next to him or her. The consultant standing next to me said, "what happens now." I said, "we just lost a couple microprocessors." We measure quality of manufacturing by even looking for flakes of skin and spittle as contaminants in the process. We are looking for quality at the level of one part per million or better, and people are the variable in that equation. We have to focus on how we are going to encourage people with empathy and compassion to make sure that we can produce the product with perfect quality.

Two critical factors for the 1990's that are absolutely essential are quality and cycle time (transparency 4). First, is quality. We at Motorola are calling it "sixth sigma". If you take the classic bell-shaped curve and look at sixth sigma, we are talking 3.4 parts per million for our operations. We have trained everybody at Motorola in statistical process control--that includes me, the chairman, food service workers, gardners, people on the shipping dock, everybody. We are asking everybody to measure the quality of their operation. Next time, when you go back to your office and you talk to a secretary or word processing operator, you ought to have a dialogue about one part per million in terms of typos. In the process of talking about quality, people in word processing reminded us it is inconsistent to ask the factory to do one level of quality and ask them to do another, and they were willing to step up to that.

The second critical factor is cycle time. Cycle time is from when you first get an idea to the time you ship it. There are people overseas making cars whose cycle time is half what it is in the United States. That's a tough challenge. We are talking about new products now, new microprocessors, with cycle time of less than a year. How are we going to get people trained? Part of the answer is with satellite. We are going to use satellite transmission for communication of management messages, for specific training and education, for knowledge, for collaboration with other companies, and for collaboration with government, because we can't move people around the country rapidly enough. They would all love to go to Phoenix in February to attend a class, but that's not in the cards. Cycle time is absolutely the key in what we are trying to do, and cycle time is in everything we do. The two key elements: quality and cycle time. I am going to come back to those later.

Next, let's consider the global environment (transparency 5). The success equation changes, and it's really changing very rapidly. Predictable operating norms have become variables. Having people doing a job is a variable. We have a factory in Florida called the Bandit Factory. (I don't know who dreams up these great names.) The Bandit Factory is a lights-out factory, and that means there are no people there. If you want a pager from Motorola today, give the order to a sales rep. Two hours from the time you give the order to the sales rep, the product is done and in the box ready to ship. We can do that economically with a lot size of one. The people who manage that factory have an average educational level of about community college plus one; and all those people are in planning, troubleshooting, maintenance, and so on. They are not touching the product. Everytime a human being touches the product, the quality goes down.

We did a teleconference a couple of weeks ago, and someone from the U.S. Army asked our chairman, Bob Galvin, "how come Motorola charges more for quality?" Bob said, "because if we are going to meet the Army's standards for quality, we have to invade the product as though we were a surgeon. We have to do an evasive procedure to enter the automation and sidetrack it to do some hand operations. By doing that the quality goes down so we have to charge you more." Our commercial quality exceeds the government specs, and we are required to build to the government specs if we want the business. Talk about anomolies. Talk about a need for communication and collaboration with the U.S. government.

The Malcolm Baldridge Award is a national award for quality, which I am proud to say we won last year. I am also delighted to say that we applied for it the first time; and I am glad we did, because there were only 50 companies or organizations who applied the first time. I anticipate this year there will be over 700 companies, and the competition gets rougher. We prophecize that if every organization in the United States acted as though they wanted to be the number one quality organization, that the gross national product would go up a half of one percent. We are striving for perfect quality. We are not quite there, and I do get reminded occasionally on my expense statements that I have not achieved it.

The success equation is changing. Tariff protection isn't going to protect us any more. We have a little window of opportunity where semiconductors, automobiles, steel and others are going to protect us. That window is disappearing. The availability of technology is universal. The Wall Street Journal carried an article the other day about Silicon Glen in Scotland where they manufacture semiconductors. Silicon Valley we all know about in California. There is Silicon Island in Taiwan. Taiwan has bought the technology, and they have decided to be a player in the game. That gives us pause to reflect. It also gives the Koreans pause to reflect for they are moving up that share of market curve very fast. How are people going to communicate about that technology? We have a plant in Taiwan, too. A lot of communication will be done by satellite. That link is already operational for business purposes but not yet for training and education.

Technology transfer velocity is increasing. The rate of transfer of technology between companies, countries, organizations is going up very, very rapidly. The message is "we better make sure the people involved are trained and educated." You can just guess how we are going to do that.

Financing becomes increasingly important in a global environment. In the 19th century accounts were settled in London in pounds sterling. In the 20th century, at least the first 89 years, they have been settled in New York in dollars. (By the way "settled on" is banker's language for how money exchange takes place.) Perhaps in the 1990's accounts will be settled on in guilders. And that is going to change the ballgame. Dollars have been the universal medium of exchange. Deutsche marks and yen are also universal. Imagine what it will be like when we have many different currencies, and we have to be as expert at money exchange and foreign exchange financing as our European friends. A little bit of a challenge there. Look what the Japanese did when they came to America. Did they look only for customers who could speak Japanese and would pay in yen? No way. Look what American companies do. They look for someone who speaks English and can pay in dollars.

Achieving and maintaining world-class leadership requires product, service and financial information (transparency 6). Accurate information is absolutely required. It's not just product quality. It's also direct delivery of the best training and education to employees, customers and vendors. Does that surprise you? We train our customers, we train our vendors, and we train our vendors' vendors in quality. We train our suppliers in quality. We have done away with incoming inspection. We expect our vendors to inspect their product and build in quality. The only U.S. television manufacturer left puts action with the slogan "direct delivery is the best training." Motorola is just beginning to do that. We are entertaining a joint program with Kodak on digital voice compression. It turns out that Kodak is ahead of us. They are a customer for semiconductors. We buy chemicals from them. But they are going to teach our engineers, and we are going to do it by satellite. We want to get three companies to cost-share this program and I'd like to get a government agency involved, too. I'll probably ask Texas Instruments, one of our competitors, to cost-share. I couldn't even go to visit them a few years ago, but now we will co-produce a product with our competitors.

World-class leadership also requires direct two-way communication between headquarters and disbursed field operations. We have over 500 operations around the U.S., and our semiconductor product sector office here in Madison probably doesn't talk to our communications sector product office. They are doing different things. We are going to interchange field offices via satellite communications. We are just starting on that project now, and I'll talk a bit about some of the obstacles later.

We need to focus on a new paradigm (transparency 7) where a successful global strategy satisfies the customer's need for products and services. This includes quality as perceived by customers and measured by their measurement system. Think about what you are willing to produce as a producer. Are you producing sixth sigma quality for your customers? If you are teaching, are you teaching at sixth sigma? Are your students turning in sixth sigma homework? I know the answer to that. I can recall from my student days. There is a dichotomy between producer and consumer as to what constitutes perfect quality. Somehow we have to synchronize the differences.

A new paradigm includes planning and operating the business with the shortest cycle time, as measured against a benchmark of world-class competition. Who do you benchmark against in whatever activity you do? Bob Galvin, Chairman of Motorola, says he has to benchmark himself against Chairman Morita at Sony. Bob invited Chairman Morita to visit him and stay at his house. The objective was not to have a direct personal comparison but to understand what Morita does. By the way, Bob Galvin is an expert windsurfer. Morita heard about this, and Bob offered to teach him. Here are two grey-haired guys windsurfing. One teaching, one learning--East meets West. Know your competition. Benchmark against them. One way to benchmark is through satellite delivery and exchange. Texas Instruments (TI) has been offering seminars via satellite in artificial intelligence and expert systems for a long time. Those classes, which are offered free and are sales related programs, were the largest attended satellite program we ever had. They were a sellout. I saw a friend at TI; and I said, "what's going on, you're offering this to everybody?" And he said, "sure." He was way ahead of me in thinking. Exchanging by satellite; exchanging technology by satellite between companies.

Minimizing variations among people is also part of the new paradigm. At Motorola people who have been with us 10 years or more have lifetime employment. No layoff; no firing without cause. Last year we lost 18 people. Bob Galvin insisted on interviewing each of those 18 personally. Bob turned down some of the terminations because he said management did not stay current with its workforce, and a manager failed to take the responsibility with the employee for training and education.

Continuous lifelong education - that means managers have to make it available and have to make it a part of the workweek. There are 2080 work hours a year. We don't think it's too much to ask employees to be in training for 40 hours and to pursue continuing education on their own. We are working very hard in partnership with universities, higher education organizations, and others to find ways to constructively move forward. We have to get out of this "we-they" fingerpointing. Everybody can fingerpoint; that doesn't solve anything.

Another dilemma facing business is an information abundance and a skill/knowledge shortage (transparency 8). We have not figured out yet how to get that information abundance to the people who can use it in a useable fashion. Distance learning has to be one of the essential keys for solving this problem. At Motorola we perceive it is satellite delivery. There are also other possibilities and we are pursuing a few of them. However, we need help from academia in sorting out the problem of information abundance and knowledge shortage. The technology engine has driven America since the Great Depression. But now we have a problem with the management of technology and skill/knowledge deficiencies in the workforce. It's a tough problem, but some companies are making progress using satellite delivery.

What are some examples of solutions to challenges (transparancy 9)? Look at the first challenge--the delivery of graduate education. A solution is the National Technological University. We have been part of the NTU family from almost the beginning. NTU now has 270 receiving sites, 2000 graduate students, and a very strong professional or noncredit program. NTU graduated 30 master's this summer. We graduated our first NTU student last summer. Next year it will probably be 60 or 100 students graduated. The grades for NTU students typically are better than those on campus, and the program is accredited. You really have to make a conscious commitment if you take an adult program when you are working. That's not something you do lightly. The attrition rate is high for people starting master's and Ph.D's who are working. But people in NTU tell us that it matches their lifestyle. Mostly, they take videotapes home at night. They see the class twice by watching the videotape once at night and then again in the morning. It is the new way to deliver education and training. It may be threatening to some people, and it may or may not be the right medium for some students who need live, personal interaction. But it works.

There are other ways satellite delivery is meeting challenges. Texas Instruments uses satellite technology to teach technology in their artificial intelligence symposium. Merrill-Lynch has daily morning meetings via satellite to stimulate their sales force. On the road to winning the Baldridge Award, Motorola conveyed its message of product quality to 115 sites and 55 companies linked via satellite.

Kodak beat the competition to the market by using satellite delivery. They put the announcement of their "disposable camera" up on satellite, where Cable News Network could pick it off. Talk about a marketing advantage. Kodak did it from Rochester, and they had the whole thing done in advance. They didn't mail out tapes and wait. They cut the cycle time, got in the marketplace, and fed the networks directly. What a clever strategy.

Another example is product development conferences with clients. Hewlett Packard does product development seminars and has advisory committee meetings with cardiologists over their satellite network. It's clearly a sales promotion, but the cardiologists think there is value in it. Product conferences by satellite seem like the way to go, and Hewlett-Packard has been in the business for awhile. They really anticipated the future.

Let's look at some of the satellite business networks (transparency 10). There's Digital Equipment, Hewlett Packard, IBM-CNET for continuing education, IBM-Field Training Net, IBM-ISEN, Kodak and TI. Hewlett Packard has been at it 5 years. They have 109 downlinks. IBM has over 270 downlinks. All of them are using satellite for productivity improvements. Other applications are to improve product cycle time, customer satisfaction, interactivity and communications. There are some success stories here.

When you think of footprints on a beach, and you see the footprints of someone else who has passed, then the footprints of the future are already there. We better make sure that the footprints of the future that we are following are where we want to go (transparency 11). Satellite delivery is already being used to compress cycle time, improve quality, and increase total customer satisfaction. I can't stress those three enough. They are absolutely essential.

The last area I'd like to discuss is satellite network start-up considerations (transparency 12). I had a conversation last night with some people who are putting in a satellite system. They said, "We're putting our antenna on the roof." I said, "Did it occur to you that if you put the antenna on the roof, and it's on a tripod, and the roof heats and cools a fraction of a centimeter, the tripod will move the antenna off axis." If the antenna moves a centimeter off axis, how much variation will there be in hitting the satellite target, which is 24,500 miles away? We are talking about a difference of many, many kilometers movement. That means it's not going to work to put it on the roof. I've had to live with this problem. Kodak did too. They spent several times what the system cost to discover the problem was the roof heating and cooling. They had several electrical engineers trying to figure it out, and it was a civil engineering problem.

The major start-up consideration is to make a difference in your business. You may be in academia, but the dean is going to want to know if it makes a difference. You may not think of it as business, but your business is education. Does a satellite network result in a tangible improvement? Even if you have lots of money or have just scored on a big grant, you are still going to have to be accountable.

A network is usually a high-level sell. And you better be ready to address the strategic business issues because you are there to talk, with great enthusiasm, about what it can do. The audience, senior management, wants to know what difference it's going to make. Focus on that.

Will your corporate communications people be involved? Talk about what telecommunications is comfortable with. Mostly they are not comfortable with satellite technology delivery unless they are thinking about digital delivery or ISDN. The telecommunications people really are not comfortable with the business we are talking about here. One of the key questions you are going to have to face is either they manage the network or you manage it. Or you manage it and they are your advisor, and that is one of the age-old turf battles. It's not going to be any different in a university than it is in a business operation. At Motorola I am managing it, and they are glad to let me. In fact they came to me the other day and said we are putting in a fiberoptics loop around the Phoenix valley, and how about if we connect your NTU receiver and put that on the fiber loop. When they found out how many T1 carrier equivalents it would take, they decided that maybe they were better off putting in receiving equipment at each plant. But it is a good idea, and we don't want to dismiss it. How far apart are we on cost? We haven't figured it out yet. Probably we will go with individual TBRO's - to be received only - at each site.

Encryption - at least for those in the corporate world and for those of you consulting with the corporate world, you better talk about encryption right up front. This one is essential. Top management is not going to be interested unless you encrypt. You don't want to talk about your strategic plans over satellite and have a direct pipeline to your competition.

Quality programming is essential. Boy, you can't save money on this one. The expectation is, "it better be in the same order of magnitude of the evening news." I am not talking about the content of the evening news I am talking about the quality of production. If it is amateur night and a one-camera shoot with a single tube camera, they are not going to watch it. People are also not going to stand around for three to eight hours of delivery. The optimum seems to be about two hours. IBM did a study on this, and I hope one of your master's or Ph.D. candidates will take a look at this and see what the optimum delivery time is for satellite programming.

Next, improvements in cycle time quality will have to be the best payoff. Are you addressing them? Are you making that a part of your satellite or distance learning project? If not, you better.

Finally, remember a large capital investment is involved and money is time and vice versa. That goes right back to cycle time--money is time and vice versa. One exchanges for the other. If you are not currently comfortable with finance and accounting, you better be because when you talk about these delivery technologies, it's a business question. The people you are going to talk to have the language of money. The back of a one dollar bill says it all. Maybe someone knows when the dollar bill was designed and, if someone is a Latin scholar, you can help me translate it. I understand that on top of the pyramid it says "Annuit Coeptis". I believe that means "reach out" or "don't fear reaching out." Bold enterprise. Across the bottom it says "Novus Ordo Seclorum". I think what that meant when they wrote it was "a new second order." You can also say E Plurabus Unum--for many one. There are some universal messages, and the one dollar bill reminds us what the message is. You have to reach out. You also have to make absolutely sure that you can talk the language of money management. Because you are now going to get the project approved.

Transparency 1

Business Challenges

Manage Culture Change

- Continuous Learning as an Ongoing Expectation
- Diversity in Workforce

Develop Partnerships

- Education/Government/Business

Emphasis on Human Capital

- Education/Training
- Funding

Plan for the Process

- Job Analysis
- Assessment
- Certification
- Communication

Transparency 2

Work/Culture Issues

- Accelerating Cultural Changes
- Multiple Careers in a Lifetime/Longer Position Cycles
- Company Loyalty Decline
- Dual Careers
- Family (Child Care, Flexible Hours)
- Reduced Promotion Opportunities
- Teamwork, Problem Solving Styles

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Transparency 3

People Issues

- Ownership/Accountability Will Be Pushed Down to the Lowest Possible Level
- Change Will Be a Way of Life
- People's Contribution Will Not Be Limited to Physical Dexterity of Their Hands
- Individual Will Be Measured as a Part of a Team
  - Multi-Skilled
  - Problem Solvers
  - Communication Skills
- Selection/Training/Retraining Will Be Critical
- More Sophisticated Products/Processes/Methods Will Mean Re-Assessment of:
  - Required Skills
  - Job Classification
  - Training
  - Education
  - Certification
  - Compensation

Transparency 4

CRITICAL FACTORS FOR THE 1990'S

QUALITY AND CYCLE TIME

QUALITY

CUSTOMERS - EXPECT PERFECT QUALITY

SUPPLIERS - MUST STRIVE FOR
TOTAL CUSTOMER SATISFACTION
(AS MEASURED BY SIX SIGMA OR
3.4 P.P.M.)

CYCLE TIME

DEFINITION

THE TOTAL ELAPSED TIME FROM MARKETING'S ASSESSMENT OF THE NEED TO DELIVERY OF THE PRODUCT TO THE END USER

GOAL - REDUCE CYCLE TIME TO EXCEED WORLD CLASS COMPETITION TO REDUCE THE PROBABILITY OF ERROR AND IMPROVE FINANCIAL PERFORMANCE.

Transparency 5

1990'S GLOBAL ENVIRONMENT

THE SUCCESS EQUATION CHANGES.

- PREDICTABLE OPERATING NORMS BECOME VARIABLES.
  - TARIFF PROTECTION DIMINISHES.
  - THE AVAILABILITY OF TECHNOLOGY BECOMES UNIVERSAL.
  - TECHNOLOGY TRANSFER VELOCITY INCREASES.
  - FINANCING BECOMES INCREASINGLY IMPORTANT.
- CREATIVELY USING HUMAN CAPITAL BECOMES THE DIFFERENTIATING FACTOR BETWEEN SUCCESS AND FAILURE.

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Transparency 6

ACHIEVING AND MAINTAINING A WORLD-CLASS LEADERSHIP POSITION.

REQUIRES:

1. EFFECTIVE AND IN-DEPTH PRODUCT, SERVICE, AND FINANCIAL INFORMATION.
2. DIRECT DELIVERY OF THE BEST TRAINING AND EDUCATION TO EMPLOYEES, CUSTOMERS, AND VENDORS.
3. DIRECT TWO-WAY COMMUNICATIONS BETWEEN HEADQUARTERS AND DISPERSED FIELD OPERATIONS ON A REAL-TIME BASIS.

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Transparency 7

FOCUSING ON THE NEW PARADIGM

THE SUCCESSFUL GLOBAL STRATEGY WILL:

1. SATISFY THE CUSTOMER'S NEED FOR PRODUCTS AND SERVICES. (SIX SIGMA)

2. PLAN AND OPERATE THE BUSINESS WITH THE SHORTEST CYCLE TIME. AS MEASURED AGAINST WORLDCLASS COMPETITORS.

3. MINIMIZE VARIATIONS AMONG PEOPLE PEOPLE BY:

   - ACCELERATING THE DELIVERY OF TRAINING.

   - FOSTERING CONTINUOUS LIFE-LONG EDUCATION.

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Transparency 8

INFORMATION ADUNDANCE AND THE SKILL/KNOWLEDGE SHORTAGE

ISSUES AND CONCERNS

TECHNOLOGICAL CHANGE HAS BEEN ONE OF THE MAJOR ECONOMIC FORCES DRIVING THE UNITED STATES SINCE THE DEPRESSION.

HOWEVER

WE HAVE PROBLEMS WITH:

- THE MANAGEMENT OF TECHNOLOGY.
- WORKFORCE SKILL DEFICIENCIES.
- WORKFORCE KNOWLEDGE DEFICIENCIES.

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Transparency 9

CHALLENGES AND SOLUTIONS

* DELIVERY OF GRADUATE EDUCATION DIRECTLY FROM UNIVERSITIES TO USER SITES.

  - EXAMPLE - NATIONAL TECHNOLOGICAL UNIVERSITY

* USING TECHNOLOGY TO TEACH TECHNOLOGY

  EXAMPLE- ARTIFICIAL INTELLIGENCE SYMPOSIUM BY TEXAS INSTRUMENTS.

* SALES FORCE STIMULATION

  EXAMPLE - MERRILL-LYNCH MORNING MEETING

* CONVEYING THE QUALITY MESSAGE INTERNALLY AND EXTERNALLY.

  EXAMPLE - MOTOROLA, THE ROAD TO THE BALDRIGE AWARD

* BEATING THE COMPETITION TO THE MARKET

  - EXAMPLE - KODAK'S ANNOUNCEMENT OF A DISPOSABLE CAMERA.

* PRODUCT DEVELOPMENT CONFERENCES WITH KEY CLIENTS

  EXAMPLE - HEWLETT-PACKARD CARDIOLOGIST SEMINARS

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Transparency 10

NETWORK COMPARISONS

	Digital	HP	IBM CENET	IBM FTN	IBM ISEN	Kodak	TI
Network age in years	3	5	2	1 1/2	4	2	6
Initial use of network[1]	C	M	T	MC	MT	T	T
Current use of network	MTC	MTC	ME[2]C	MC	MTC	MTC	MTC
Initial no. of downlinks	18	50	6	Unavail.[3]	14	54	6
Current no. of downlinks	75	109	18	250	22	64	54
Planning more expansion?[4]	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bdcasting. to customers?	Yes	Yes	No	Yes	Yes	Yes	Yes
Encrypting broadcasts?	Yes	Yes	Yes	No[5]	Yes	Yes	Yes
Justification for network:							
Improve productivity	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Increase sales	Yes	Yes	Indirect	Yes	Yes	Yes	Yes
Improve market share	Yes	Yes	Indirect	Yes	Yes	Yes	Yes
Shorten product cycle	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Improve customer satisfaction	Indirect	Indirect	Yes	Yes	Yes	Yes	Yes
Allow interactivity	No	Yes	Yes	Yes	Yes	Yes	Yes
Improve communication	No	Yes	Yes	Yes	Yes	No	Indirect[6]

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[1] M=marketing; T=training; C=communication

[2] E=education.

[3] Unavailable information

[4] Digital will expand to 150 downlinks by the end of 1988. CENET will expand to 27 downlinks by the end of 1988, reaching 90% of their population target. HP and TI are expanding in Canada and Europe, as well as in the U.S. FTN will expand to 350 sites by the end of 1988.

[5] Is scrambling broadcasts, not encrypting.

[6] Although not an initial justification for the network, TI states communication was enhanced.

Transparency 11

FOOTPRINTS OF THE FUTURE

THE INDUSTRY LEADERS ARE ALREADY USING SATELLITE DELIVERY TO:

- COMPRESS CYCLE TIME.
- IMPROVE QUALITY.
- STRIVE FOR TOTAL CUSTOMER SATISFACTION.
- IMPROVE PRODUCTIVITY.
- STIMULATE SALES.
- IMPROVE MARKET SHARE.
- TRAIN AND EDUCATE STAFF.
- COMMUNICATE MANAGEMENT MESSAGES
    - INTERNALLY.
    - EXTERNALLY

Transparency 12

BUSINESS SATELLITE NETWORK STARTUP CONSIDERATIONS

1. YOUR NETWORK NICHE FILLS MUST RESULT IN A TANGIBLE BUSINESS IMPROVEMENT. DOES IT?

2. A NETWORK IS USUALLY A HIGH LEVEL SELL. ARE YOU READY TO ADDRESS STRATEGIC BUSINESS ISSUES AND MAKE PREDICTED RESULTS HAPPEN?

3. IS YOUR CORPORATE TELECOMMUNICATIONS DEPARTMENT WILLING TO MANAGE THE SYSTEM PLANNING AND INSTALLATION?

4. MOST SUCCESSFUL NETWORKS HAVE USED AN EXPERIENCED EXTERNAL CONSULTANT AND/OR INSTALLER. WILL YOUR CORPORATE TELECOMMUNICATIONS ORGANIZATION FEEL COMFORTABLE WITH "AN OUTSIDER" ?

5. MOST CORPORATE NETWORKS FIND ENCRYPTION NECESSARY. HAVE YOU REVIEWED THIS FACTOR WITH YOUR CORPORATE SECURITY STAFF.

6. QUALITY PROGRAMMING IS ESSENTIAL. CAREFULLY CONSIDERED WHETHER DEVELOPING YOUR OWN OR BUYING PROGRAMS FROM AN ORGANIZATION SUCH AS NTU IS THE BEST APPROACH.

7. IMPROVEMENTS IN CYCLE TIME AND QUALITY WILL HAVE THE BEST PAYOUT. ARE YOU ADDRESSING THEM?

8. REMEMBER - A LARGE CAPITAL INVESTMENT IS INVOLVED. MONEY IS TIME AND VICE VERSA.

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DISTANCE EDUCATION: CONSOLIDATING THE GAINS

David M. Grossman

When Dr. Chere Gibson called me to help her out of a jam and provide you with a Tailnote or Keynote Address, I could not help but respond with what my adopted state calls "Minnesota Nice." Dr. Gibson called me in part because she knew I liked to provoke, tickle, and prod. She knew I would respond yes, with Minnesota Nice, but what she really was after was my native New Yorker attitude and posture of criticism and, no doubt, hectoring. I hope I do not disappoint. I know you will leave this three-day conference energized and filled with enthusiasm, determined to apply what you have gained here to your own worlds. But as you leave, let me give you something to chew on and perhaps something to gnaw upon you.

More than 40 years have elapsed since telecommunications was advanced as a significant innovation that would have major impact upon instruction in higher education. Seemingly, only now is it on the threshold of making a difference at our institutions and on our students, especially as we try to reach out to those distant from our campuses.

Introductory Note by Chere Gibson:

Self criticism is never easy, but if a field of practice is to grow it will do so only if it takes the time to reflect on itself, on its strengths and its weaknesses. Loving critics are few and far between. Dr. David Grossman represents one such individual. A former Dean of Independent Study at the University of Minnesota, he knows of what he speaks. He has taken the time to reflect and has shared his reflections in many forums, one of which was the 5th Annual Teaching at a Distance Conference. For those of you who are intrigued and wish to pursue some of Dr. Grossman's ideas further, his work entitled Hidden Perils, which evoked considerable discussion with the continuing education community, is a good place to start.

Grossman, D. 1987. Hidden Perils: Instructional media and higher education. Occasional paper No. 5) Washington, D. C.: national University Continuing Education Association.

Why now after all these years? In my opinion, we are able to stand on this threshold of significance again primarily because new technologies have freed us from depending so heavily upon broadcast delivery for instruction. Now we are able to reach students, individually and collectively through a variety of means. Beyond broadcast, students can now study at home, at work, wherever, whenever they want, through audio and video cassettes, through computer-assisted instruction on PC's, through electronic mail and computer conferencing, through telephone bridges, through instructional television fixed service, that is, instruction beamed to specific sites, through video discs and by cable television and satellite transmission for either interactive courses or for downloading of programs for future viewing.

Education through media or the old educational television suffered the same fate as high-brow programming in the television era, it was virtually shutout. Television, be it public or commercial, is a medium that is dependent upon attracting major audiences. TV turned away from much that was formally educational because such programming is, by its very nature, limited in audience appeal. In order to obtain exposure on broadcast television, all of us have been laboring under the burden of having to create instructional programs that would appeal not only to students but to a general audience as well. The result had often been that we had to invest heavily in production values that often exceeded educational purposes of our instructional programming.

Now we have ways in which we can reach students individually, ways which allow students to schedule their own study and education. The prospects for new courses and new programs seem vast to me. We can develop instruction for discrete audiences, such as professionals in many fields, for students taking esoteric subjects, or subjects of very limited student interest, and we can begin to produce educational programs that utilize the media to their best advantage in ways that are not nearly as expensive as the production of television or telecourses. This is not to say that costs in all media will necessarily be low. The production of a video disc, for example, might require significantly more than what we would invest in a television course. Nonetheless, we can design instructional media offerings that are appropriate for what we are trying to achieve educationally. Here is the extraordinary potential to realize the benefits of new technology.

I would be remiss in telling you that our standing on this threshold of effectiveness for so long has been due solely to our dependency on broadcast for delivery, and now with that lifted, our golden age is here. There are, of course, other barriers that have long contributed to keeping distance education and technological delivery of instruction on the periphery of our institutions. Sacred explanations have been: high cost of delivery, our under-funded media units, and faculty resistance to technology and innovation. Indeed, as some have pointed out, it has taken more than 40 years for the overhead projector to wander out of our bowling alleys and into our college classrooms. I readily concede the validity of these explanations and other impediments that have served to keep us forever on the threshold. Nonetheless, in addition to these explanations, I think we must look to ourselves as contributing significantly to our own lack of success to date. If we are to cross that threshold we must address the impediments of our own making, lest we waste this moment of opportunity.

For too long we have labored under what I call our own two-culture problem. We have, on the one hand, the world of those who specialize in the development and delivery of mediated instruction, and the academic culture which prevails in all our institutions of higher education on the other. We have created our own world and have thereby perpetuated our marginality.

I believe that this two-culture problem more than anything else has been the primary contributing factor to telecommunications and media-assisted learning in playing a minor and institutionally insignificant role in higher education in this country. We perpetuate our differences and we are rendered powerless because of it.

Our window of opportunity is open again, but it will shut mighty fast unless we address this two-culture problem. I fear, however, that we are not. Let me give you several examples of how distant we are from our colleagues in higher education, and how we continue to be out of touch with the culture of institutions which employ us. What I say here will apply obviously to those of us in colleges and universities, but I don't think it will require much to extrapolate from my remarks some lessons and concerns those of you in private industry, the public sector, and secondary and elementary have within your own unique institutional context as well. Again, here are indications of our being out-of-step and out-of-touch.

Item 1- Learner

We use the word learner incessantly. We talk of learner outcomes, learner experiences, etc. We talk about the adult learner. We justify ourselves in the name of serving the learner, and all that we do to enhance the learning situation and make learning easy or easier. Colleges and universities use the word student. What is the difference? Let me give you a definition of each. These definitions are from the Third Edition of Webster's New International Dictionary: Learner--one that learns:student, apprentice: a beginner in some field (a slow learner). Specifically, an employee being taught and trained to perform a task or fill a position requiring a degree of skill and experience through instruction that is usually informal or of indefinite duration as distinguished from that of an apprentice. Here is the definition of student--from studere, to be eager, to be diligent. A person engaged in study; one devoted to learning as one enrolled in class or course in a school, college, or university. One who independently carries on a systematic study or detailed observation of a subject (a student of human nature). I ask if you were a college faculty member, would you rather be educating students or learners as so defined. Now I know that the field of adult education in particular has tried to enhance the meaning of learner, has tried to get us to invest more in that word so that it conveys to those in our field, a more effective and energetic participant in the learning process. But the meaning as decided by those who compile dictionaries is, in fact, the opposite, and it is that meaning as provided by the dictionary and not by educators that is operative for our university colleagues. Frankly, to use the word learner in the modern university is to put teeth on edge, and immediately brands one who uses it as someone other than a colleague. I know it seems a small point, but the rhetoric we employ to explain our work and to justify our existence has a powerful impact, and this use of the word learner denies us a constituency within our institution, namely the faculty that is essential to our cause.

I must confess, I too have trouble with the term learner, and I too take my direction from the dictionary definition. The use of the term learner places the burden of education upon the institution and on the faculty or teacher. This burden is unacceptable in the culture of the university. Education is as much the responsibility of the student, if not even more so, as it is of the faculty. Students who come to the university have obligations, obligations not implied in the term learner. And let me point out to you even in our own common usage, we refer to slow learners, but quick studies.

Even if learner were acceptable, I would not want to undertake the burden of converting the entire university to our terminology and nomenclature. Universities and colleges do not have vice presidents of learners, do not have vice presidents of learner affairs. I know of no institution that has a learner aid office. I know of no university that has a work learner program. Why not simply go with the standard terminology rather than use a language that has more meaning to us than to our audience.

Item 2: A Mechanics View of Higher Education

Let me read to you from a recent issue of The Chronicle of Higher Education, a statement from the Director of the Adult Learning Service of Public Broadcasting Service. "A telecourse has every element of a traditional college course, including interaction with a faculty member. Telecourse students must read assigned texts, write papers, and take tests. For those using a telecourse for off-campus study, most colleges require them to have regular contact--whether by phone or computer or in person--with the professor assigned to the course." Let us assume the Director was quoted correctly and in context. Perhaps I am being too generous to the press in general, and the Chronicle in particular, but let us proceed. Let me focus on two phrases here that reveal a mechanistic view of the university and perhaps a lack of understanding of the culture of institutions. First, the last phrase, "with the professor assigned to the course." It is almost as if the Director of the Adult Learning Service believes that a faculty member is out here, and the course is out here, and someone assigns him or her to grab and hold on to the course. You and I know that faculty are not assigned courses. A faculty member undertakes one and develops it--the course is hers, not an independent entity with an intellectual life of its own. It is like in the Navy, when the Admiral of the Fleet comes about the ship, she is piped on board as the fleet itself. She personifies, she is the fleet. Similarly, the faculty member is the course. It is her views, her course, her views are not assigned. These terms reveal a mechanistic approach to universities and colleges and to their administration and their culture. The institutions of higher education are not seen in organic terms, but solely in mechanical, administrative terms. We all fall into this trap from time to time, but usually it is wise not to reveal this to those we assist. To verbalize this mechanistic conception of how instruction is provided and determined, even if it is true in some institutions, does damage to us both publicly and within the institutions. The other interesting word here is "interaction." Faculty don't interact with students, they have lectures, recitation, office hours, sharing of ideas before and after class--a relationship in fact with students that goes far beyond the rather mechanical and sterile term "interaction". To use these terms in the context of university discourse, especially with faculty, but even with administrators, is, like the impact of the word learner, to put you in the minds of so many at our universities and colleges even further to the periphery.

Item 3: The American Journal of Distance Education

Here is a publication that aspires to provide a forum for intellectual leadership, for the dissemination of objective research on and about distance and technology-assisted instruction. The publication is taken to signify the coming of age of this field. The very use of the word journal in its title, conveys the sense that this publication is refereed and of academic and scientific objectivity, but appearances here might be deceiving. Initially supported by the Annenberg Corporation for Public Broadcasting Project, members of that funding source and their clients sit on the editorial board of this publication. This, in effect, violates one of the cardinal principles of sponsored scholarship and publications of American philanthropy and of the American research enterprise. By not separating the funding from scholarship and its dissemination, the presence of Annenberg staff on the board of this publication creates the appearance, or the potential for, intervention and interference in this journal which purports to be objective. Is The American Journal of Distance Education, a true journal or a house organ of the Annenberg CPB? To me it constitutes a scandal in academe and a sham, and I for one do not understand how one of our great state universities can in good conscience act as publisher or how scholars can take pride in finding an audience for their work through this publication. I cannot convey more strongly my embarrassment that our own field is so weak that we take this publication as our own, given its compromised status. Annenberg support is certainly not concealed, but making it public does not make it right. I hope scholars would realize that their work is subject to scrutiny prior to publication by those who have a vested interest in demonstrating the efficacy and legitimacy of their specific approaches to distant delivered education. The editors and the funders of this publication in my opinion have gone against the cake of custom, of academic propriety, and in parading a house organ as a journal of objective research and opinion, have damaged the credibility of our own field with our colleagues. This publication is severely compromised, and if considered as representative of all of us, then we are compromised as well.

Item 4 - Educational Research

When we cite educational research to legitimize our programs and the use of that research to demonstrate the efficacy of instruction as offered by us, we do ourselves additional damage. For better or for worse, whether true or untrue, educational research is held in low regard by most of our faculty colleagues. The research is deeply discounted, and frankly holds no credibility, holds no water with those who want to impress, to convert, and to be our advocates for funding. Additionally, faculty are not necessarily preoccupied or solely concerned with "learner outcomes," which would be identified or verified by such research. We would be better off if we were less concerned with demonstrating the efficacy of our programs upon student learning, and more active in demonstrating how our work can have a positive impact upon faculty, intellectual lives, instruction, and research.

Item 5 - Faculty Bashing

How often have we heard the plaintive cry, "My faculty suffers from the 'not invented here' syndrome"? This characterization of the faculty as suffering from some disease or ailment, and at the same time serves to dismiss the validity of faculty-held views on their role in instructional development, reveals our distance not only from those whom we presume to serve, but our lack of understanding of what faculty contribute to the development of instruction on our campuses. Other phrases such as "content specialists" or "managers of student learning experiences" offend many of those with whom we want to work. At our meetings we often engage in venting our frustrations of dealing with faculty. We express it to each other and often in private. But let me assure you those views get carried over into our relations with faculty if not directly, then by the conveyance of attitude. We are critical of faculty conservatism and often fail to realize that higher education by its very nature is a conserving institution and quite conservative. Faculty bashing is bad business.

Item 6 - My Final Item: Making Learning Easy

When we characterize our efforts as making the acquisition of knowledge easy or easier, we also injure our own credibility. Making knowledge convenient and accessible should not necessarily make it easy. Acquiring knowledge is difficult by nature. Richard Fenneyman, the late physicist from Cal Tech, writes about how difficult it is to know anything. Similarly, faculty are usually committed to the belief that learning ought to be a struggle, learning which endures is something which has been strived for, achieved, and won. Our efforts to make things simple and easy, at least at the collegiate level, does not endear us to those we serve. Stories of telecourse administrators who pay faculty on the basis of student completions or with incentives and bonuses for completions are inviting abuse, damaged standards, and injure our own standing in the university.

I have gone on now for sometime about our two-culture problem and how we are perpetuating it. You and I know why this cultural dichotomy separates faculty from us. In many cases the causes are universal ones, present at schools, both small and large, at research oriented universities or teaching oriented community colleges, at universities and colleges both secular and religious. In many respect we administrators are to blame. We assume that our deadlines, our own concerns with accountability, our need to generate numbers, our own technology problems, must be of equal interest to the faculty. They are not, nor should they be. The faculty are paid to profess-to do original scholarship, to teach and direct students, to fulfill roles in the governance of our institutions. Their first duty is to their research and their traditional classrooms. Their accountability is measured and their accolades come from their quality and quantity of their scholarship, and from the quality of their classroom work. We as administrators have our own jobs to assist them, since most, if not all, of the institutions have primary missions in the classroom, libraries, and laboratories. Then it follows that we administrators must find a way to bridge these cultures, a task which should be made simpler if we understand that neither of these two cultures speak a common language. If we administrators believe our role to produce and deliver media-assisted course material is both serious and worthy, it is up to us to show the faculty how our jobs can enrich their roles and how our mission is one they would wish to share.

To do this we may have to make significant but fairly painless changes. Elementary and secondary faculty should be given paid release time to participate in the preparation and development of our programs or to utilize that which we produce for use by their students. We should pay faculty more for their work in course development. We should make their contributions integral to course development, not merely serve as "content specialists, or managers of student learning experiences." We may have to find a way so the faculty feel they have and do indeed have an intellectual proprietorship. These are consequences that may be a bit more painful to us. Our media projects may not attract great numbers of students. Indeed, our projects may not be at all economical. But, if we make these concessions we may find faculty, in the future, more willing to work with us on those projects we deem more desirable.

In short, if we believe in what we are doing, why not allow faculty to make full use of our capabilities. If the quality is there, they will be back again.

If there is, as I say, a two-culture problem, it is not the faculty's job to understand us, but it is our job to understand them. We must take the first step to build bridges between our two worlds. The first pier is demonstration of our willingness to truly engage our faculty in the development of the instruction we want to deliver and not to cut them out or provide a peripheral role. The second pier for that building bridge ought to be our joining the conversation on instruction that is held everywhere in this country. I can only speak for my own institution, one that is obviously deeply committed to research, but I can align my program with those on campus, with those who insist upon the interrelationship between teaching and research. Every institution, from the premier research institutions to the comprehensive community colleges, is committed to accountability for what takes place in the classroom. That accountability is ensured by the collegiate processes of peer review and tenure. The accountability of all these institutions is naturally extended to the programs we offer as it should be, since we claim that what we do is an extension of the classroom. The faculty member is both accountable and the instrument of accountability for our institutions, and, therefore, our programs must start and end with the faculty at our respective colleges and universities.

I ask you to ask yourselves a simple series of questions about what you do. Ask yourself, "How do my efforts to promote media-assisted distance learning help my faculty colleagues?"

Ask yourself, "Does what I do injure or enhance those who have undertaken collegiate instruction as their profession and career. Do I contribute to or do I degrade faculty roles?" Positive answers will lead you to institutional influence.

Build this bridge, join the culture to get your institution behind you, then do what you must do. Negotiate with other providers, build the systems, the infrastructure, the telecommunications backbone, all that you need to serve your state and region. Assert the importance of higher education as these systems develop. Persuade your institutions and your state education offices to end the squabbling of territoriality, now increasingly passé. As telecommunications transcends geography, agree to compete on the basis of quality, price, and accessibility. Above all, develop those programs reflective of your institution, go where your institution wants to go, and take a role in the collaborative leadership necessary to move your institutions forward.

The new technologies provide us with new opportunities to engage our faculty, to convince our senior administrators of the efficacy of instruction through technology and the chance to utilize the facilities and faculties that most of us have already. Even the smallest institution is capable of doing its own thing, albeit limited and on a shoestring. It is our job to engage the faculty, to get the money and to get on with it.

THE HUMAN RESOURCE IMPERATIVE

- Pamela Havner Atkinson -

Fifth Annual Conference on Learning at a Distance
Madison, Wisconsin
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As I began to prepare this talk, I started to gather the normal amount of data one gathers to substantiate the facts given in a talk such as this; I'm sure you know what I mean: the various charts, graphs, and slides; the columns of comparison numbers that tell us where we are as a nation, where we've been, and where we're headed.

But the more numbers I gathered, and the more graphics I collected, the more I felt that I was missing something crucial to our understanding of what I meant to address when I titled my talk "the human resource imperative."

This questioning process made me realize that I had begun to focus on what I now believe to be the lesser or "micro" aspect of the problem; that is to say, concern for the projected *numbers of people* needed to fill all the jobs that will be available in the year 2,000 and beyond,

My concern for the numbers is not without cause, however. The demographic shifts that our nation is experiencing; for example, the diversity of the ethnic population in the state of California and how the University of California - all nine campuses - responds to that diversity, (as other states watch intently taking note of the results); plus the waning enrollments in science and engineering disciplines - all of these issues come together in a numbers game, and there is a great deal of speculation and concern in Washington about where the next crop of engineers and scientists will come from, should a worse-case scenario present itself. As a matter of fact, this is of such concern to the National Science Foundation and the National Academy of Engineering that they have asked the National Research Council to bring together a group of experts from business, government and academe to study the question of the adaptability of the engineering work force and the role it plays in our nation's future.

But I think we are looking at the wrong side of the coin when we focus our attention on the numbers as numbers. This is a narrow, limited view, and it keeps us from seeing the larger, "macro" part of the picture. Matching or tracking people to jobs they will have in the future is not nearly as important as PREPARING them for those jobs. We need to focus our attention on people currently in the workforce today and systematically upgrade their skills and knowledge base in preparation for what they will be expected to do, because we know that 3/4 of this current workforce will be the workers of the year 2,000.

People are healthier and living longer, and they have the capacity to lead fuller, more productive lives. Continuing education programs are the key to people becoming more expert in what they already know, or moving into a new area of expertise, or preparing themselves for a new occupation.

Education had been a major theme in this country, on the agenda of every politician since a national commission was formed in 1981 to prepare a report on the quality of education in the United States. Not too many people knew about that commission then, but when their report was disseminated in April of 1983, the entire nation stood up and took notice, because the rhetoric of the report commanded our full attention. [1]

Some choice excerpts from the report were widely quoted; and I'd like to read some of them to you:

> Our Nation is at risk...the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people...If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war.
>
> The people of the United States need to know that individuals in our society who do not possess the levels of skill, literacy, and training essential to this new era will be effectively disenfranchised, not simply from the material rewards that accompany competent performance, but also from the chance to participate fully in our national life.

Each time I read those words I feel the intensity and power of their meaning and I realize that, indeed, something must be done to turn back that tide of mediocrity.

We can take heart by the fact that a great effort is underway in a number of arenas. Local, state and national groups have poured money and resources into K - 12 programs. Companies have spent hundreds of thousands of dollars on remedial education courses in the workplace, as well as donated money and equipment to supplement local and national efforts at the K-12 level. Colleges have had to channel vast sums of money into basic english composition and math classes because college freshman are not adequately prepared to tackle college-level work when they graduate from high-school.

But redefining and guiding elementary and secondary education to prepare those who will be our leaders and workers in the future is not enough. Those workers - engineers, accountants, nurses, doctors, assembly line operators, business managers, educators, journalists, computer programmers - are a collection of individuals with various skills and talents, and we need to see keeping them up-to-date not as a benefits problem with no immediate return on investment, which is the typical way employers view them, (and view educational programs); but as an untapped resource. We can begin to do that, if we look at them as people, rather than *numbers*. That is difficult, particularly for researchers, because our tendency is to consistently group them into round-number aggregates so that they will fit neatly on our statistical charts.

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[1] National Commission on Excellence in Education. 1983. *A Nation at Risk: The Imperative for Educational Reform*. Washington D.C.: U.S. Government Printing Office

The rhetoric of *A Nation at Risk* was considerably more dramatic than your average national report, and it achieved the desired effect. Why? Because it was on the money about the problems in our educational system and everyone knew it. It proposed a number of recommendations, and, more than that, it also defined an educational paradigm for the future.

Somehow, in everyone's zeal to tackle "part A" of the problem at its foundation, by correcting and monitoring the teaching and learning process in K - 12 schools so that excellence could replace mediocrity as soon as possible, "part B" -the vision of the future - was somehow shunted to the sidelines. Not overlooked, exactly, but not very much supported and encouraged.

What was "part B" of "*A Nation at Risk*"? It was the second half of the learning equation. It told us that if we were to thrive as a nation, we needed to create a coherent continuum of learning for ALL our people, not just an elitist "few", and only then would the United States become once again, a "Learning Society".

A coherent continuum of learning, to the assembled ears of the multitude, still sounded like the "continuing education" of the 1950's, which had the reputation of being something that you do in your spare time, and it is somehow associated with pursuits like basket-weaving and elementary conversational Spanish. Nothing could be further from the truth when we talk about continuing education of today; in today's technological age, it is educational currency that represents a strong investment not only in the future of individuals, but in the nation's future as well.

Let me read some of what the committee had to say about becoming a learning society:

> The search for solutions to our educational problems must also include a commitment to life-long learning. The task of rebuilding our system of learning is enormous and must be properly understood and taken seriously: Although a million and a half new workers enter the economy each year from our schools and colleges, the adults working today will still make up about 75% of the workforce in the year 2000. These workers, and new entrants into the workforce, will need further education and retraining if they - and we as a Nation - are to thrive and prosper.
>
> In a world of ever-accelerating competition and change in the conditions of the

> workplace, of ever-greater danger, and of ever-larger opportunities for those prepared to meet them, educational reform should focus on the goal of creating a Learning Society. At the heart of such a society is the commitment to a set of values and to a system of education that affords all members the opportunity to stretch their minds to full capacity, from early childhood through adulthood, learning more as the world itself changes. Such a society has as a basic foundation the idea that education is important not only because of what it contributes to one's career goals but also because of the value it adds to the general quality of one's life...
>
> In our view, formal schooling in youth is the essential foundation for learning throughout one's life. But without life-long learning, one's skills will become rapidly dated.... (We need)... a coherent continuum of learning.

Again, if people are living longer - and they are - and we all know that the workforce is shrinking due to a baby bust, doesn't it make good sense to systematically prepare ourselves for the remaining fifteen, twenty, or thirty years of productive work that lie ahead? And why shouldn't that preparation take us into another field entirely, if that's what interests us? If we incorporate lifelong learning, not only as a philosophy but as a practice, into our daily and weekly routine, we can prepare ourselves for a new career even as we are actively rounding-out an old one. This then is the human resource imperative, that we owe to ourselves and our children. To commit a portion of our time and our resources to the active practice of lifelong learning, so that we do not become trapped in a frame of mind that tells us that education stops when middle age begins.

Not a bad idea, you say, let's do it!

Ahh, but it's not that easy. After one has changed one's own life and philosophy to include the concept and practice of lifelong learning or, to use another term, continuing, career-long education, how does one begin to change the life and philosophy of the myriad entrenched institutions that are the natural providers of that lifelong learning that is the object of desire?

How does one change the mind-set of the corporation that believes that the only appropriate work-time is 8 to 5, has no idea of what job-sharing means, assumes that child-care is a problem that doesn't concern them in the slightest and has never even considered that time off for education and training of its employees should be considered part of the cost of doing business?

And how does one convince the 40 year old engineer or the 50 year old manager that they will do well in a class in statistical process control if they put their minds to it, even if its been 10 or 20 years since they last picked up a textbook?

It's not easy to move mountains, but with patience and persistence, a warrior for the cause of lifelong learning might be able to persuasively advance some or all of the following ideas to those who stand in the way of change:

- We have never been in a technological age before. We are in one now and it requires us to look at things differently.

- The timeframe for learning is not linear, demarked by the age of 5 years at one end and 30 years on the other; it is rather a spiral, to be embraced at many stages of life, as opportunity and need present themselves, over and over again. For the brain is a dynamic organ, and if it is used to learn new things, the capacity to learn new things maintains itself, and, according to some researchers, may actually improve with age.

- Time is our most precious commodity. In today's nuclear family, with both parents working, it is hoarded like gold. That which saves time also saves money and energy.

- The traffic flow in and out of prime urban areas is a misnomer; what we have now is gridlock, and it gets worse every day. Why drive in commuter traffic four hours every day when you can walk down the hall or drive to a junior college nearby and take the class on tv? That way, you still have the energy to do the homework at night!

- If each college and university offered continuous opportunity for lifelong learning to its own graduates, it's likely that those graduates will think kindly of their alma mater at fund-raising time.

- Distance learning saves money, time and energy, and gives you, any way you look at it, the best bang for your buck.

- Distance learning via telecommunication technologies has the potential to be the most cost-effective learning of all, because it has the capacity to reach thousands of people during one program hour.

- Studies show that motivated adults do quite well with distant learning modes, including videotaped courses, often times better than on-campus students taking the same courses in on-campus classrooms.

Because this is a conference on distant learning, I assume that you are either buyers or providers of instructional courses that are transmitted via computer or television technologies. Although the potential in these technologies is tremendous, we know there are some problems. *The American Educational Research Association Special Interest Group: Training in Business and Industry*, at a meeting March 27th in San Francisco, highlighted a number of issues that concerned them:

- There is a great need for applied research in the effectiveness of various instructional design models; the need is to find the right model for the right teaching task.

- There are 4,000 new knowledge-based systems technologies and no one is coming up with any new ways to use them.

- We don't even use the current or "old" technologies very well, as witness the preponderance of "talking heads" or as consultant Jerry Brown of HP said, "a bunch of old guys on tv."

- We need to have training systems that will produce engineers that can design and build multi-media systems.

- We have to think about different ways of presenting information.

- We need data that can provide us with workable theories that can be tested to justify the use of these various technologies.

- We need some cost-benefit models, because the front-end investment is considerable.

- The technology is there and its great, but we have a long way to go to use it to its optimum capabilities.

- (XEROX: is apparently building a Learning Research and Development Center that is using artificial intelligence to do instructional design; does anyone have any information on that?)

Working adults are looking for ways to increase their knowledge, add to their skills, improve their worth to their employer, prepare for a second career or advance in the one they have. But the reality of what its like to work an eight hour day and raise a family often argues against the desire to continue one's education. Child-care problems, physical illness or disability of an aging parent, financial difficulties, job stress - all have an effect on an individual's ability to do their job, and adding a program of continuing education to one's daily life may seem to be impossible.

But if educational institutions adopt a more positive approach to the concept of lifelong learning and perceive the adult student as worthy of their attention, and if employers begin to budget for maintenance and upgrading of their employees just the way they budget for the maintenance of their equipment, a number of modifications to these various entrenched systems could be made that would encourage greater employee participation in educational programs. For example, employers that permit flex-time, job-sharing, taking work home, split shifts; and in addition, provide financial reimbursement of job-related courses and recognition of newly acquired skills and knowledge, and who evaluate and promote managers, in part, by how well they support the education and training of those they supervise, are companies that are serious about their commitment to maintaining the professional competence of their employees. Those companies actively demonstrate their support of the educational programs that their human resource departments advertise. Programs without such support mechanisms are, unfortunately, doomed to fail.

Just as employers need to adjust to these modern times, providers of college-level instruction also need to be sensitive to the changing times and modify archaic canons to meet the needs of the marketplace. They could begin, for example, by rethinking the appropriateness of provincial rules that may have been perfectly suited to the industrial age, but have outlived their usefulness: For example:

- You have to come on campus if you want to take one of our classes; eye-contact with the professor is important. (The fact that it is impossible to see many professor's eyes because they are speaking from a podium in an 500-seat auditorium, makes no difference to those who specialize in reiterating this rule.

- Continuing education? Here? Why?

- Off-site students watching my class on television? I'm not so sure I like that. What's in it for me?

- I don't think I want to send my course out on videotape. What if someone listens to it more than once?; they'd have an edge over other students! (A professor [not at Berkeley, in case you're wondering,] really said that.)

- I'm terribly sorry that you're company has relocated you to this area, and I know that (check one) Stanford, Berkeley, Cal Tech, Wisconsin, whatever, is a VERY good school, but we can only accept 6 graduate units for transfer; that's the rule. You have 20 units towards you're Master's? I'm so sorry; 6 units is our limit; we don't want to dilute the quality of our degree.

- Continuing education? Sorry, that is not our mission; our mission is research and teaching; and that's just the way it is.

The national report *A Nation at Risk* emphasized that the educational problems of the country are endemic, and if they are to be corrected, there needs to be a national response. A number of institutions have begun to meet the challenge of providing career-long education to engineers; for example, by opening their degree-granting programs to part-time students, and they are to be commended. Those who are slow to follow suit need to be encouraged to find a way in which THEY can make a contribution. As far as continuing education for engineers is concerned, every school needs to get involved.

In addition, professional schools that prepare people for technical careers, such as schools of engineering and computer science programs, should let students know about the realities of the marketplace, so that they have some idea of what they are getting into. Employment by contract is a practice that is growing, and young people being hired by business and industry need to know about it, so that they will be prepared to think of themselves and their special talents and skills in a much more entrepreneurial way than they might have heretofore.

To give you one example of what I mean: LabSupport, a "rent-a-scientist" agency located primarily in California, placed about 1,500 scientists and technicians in temporary jobs lasting an average of four months each during 1988.

A great many jobs of the future, more so than we can imagine, will be the "consultant"-type job, where individuals will market themselves on a contract basis, or hire-out to a consulting firm, which acts as the contract broker to industry. That means that they will have to shop around for all the benefit packages that, up until now, the American workforce has historically expected the company to not only acquire for them, but to pay for.

And the issue of childcare, though now not addressed by industry with any degree of real commitment, is a problem that will not go away or resolve itself. These two issues are two opposing ends of a spectrum, one side that has no choice but to spend enormous sums of money providing a service that is a necessary imperative if they are to hire and retain good workers; and the other side that chooses to focus on cost-cutting measures that eliminate worker benefits entirely and relegates notions of loyalty and commitment to memory lane.

Simply put, the human resource imperative has become, for many companies, a roadblock, and people fall victim to a capital-intensive economy which has no problem investing money in machines but finds it difficult to invest money in the care and maintenance of people.

Hiring and firing of people is an everyday reality that is part of the technological age and no one nowadays assumes that the first employer that hires them will be their employer for life. In fact, most college graduates believe that the choice to move on to a better job is THEIR choice to make. For some of these young people, it's a shock when they realize that the company that has hired them can also choose to let them go without warning. (The August 7th edition of the San Francisco Chronicle mentioned that a recent survey of workers indicated that the average length of stay in any one CAREER is 6. years.) For some it may be even shorter than that. As one educational manager of a multinational corporation told me:

> We are in a knock-down, drag-out toe-to-toe battle with our competitors, and they are at the top of their league. We're not just talking market share here, we're talking survival. For the people that work for us, constantly improving their skills and technical competence means that THEY GET TO KEEP THEIR JOBS!

Sometimes just keeping your job turns out to be an intangible goal; let me read you some items that appeared in a Bay Area report last year:

> In order to cope with a tight budget, Santa Clara county imposed a partial hiring freeze through June 30th for the 1988, 89 fiscal year. The action impacts about 1,000 full and part-time positions.
>
> The Employment Development Department predicted record-high employment levels in Santa Clara County during the next six months, led by a strong electronics

> industry. INTEL and National Semiconductor have recently had to lay off members of their technical work force. (Since INTEL is also identified in the same newsletter as an aggressive recruiter, it appears that the company may be sending mixed messages to prospective employees.
>
> Since 1980, San Francisco has witnessed a 35% increase in practicing attorneys; that translates to a ratio of one lawyer for every 62 city residents.
>
> A recent study by the Bureau of National Affairs revealed that employer liability for bad hiring and firing decisions is rising. Suits for wrongful discharge increased by 22% in California last year. (Some reason for the increased number of practicing attorneys, perhaps?)
>
> Lockheed Missiles and Space Co. of Sunnyvale expects to slash 500 to 1,000 jobs in its space systems division this year because of a defense contract cancellation.
>
> BankAmerica intends to cut up to 5,000 jobs this year. Since 1986, the nation's third largest bank has reduced its staff by 27%.

I mention these events to remind us of the realities of a changing world and a changing marketplace with an infinite number of changing preferences. What's important, I think, is to remember that nothing is guaranteed. We need to put our faith, not in our predictions, but in our people.

Pat Choate, economist and director of TRW, Inc.'s Office of Policy Analysis, says in *The High-Flex Society* (1986):

> The prime resource of the U.S. Economy is neither its great stock of money, plant, equipment, and technology nor its abundant natural resources and rich cropland. Rather, it is the knowledge, skills, wisdom, enthusiasm and versatility of the American people.
>
> The formidable task of preparing people for the years ahead requires less than wholesale revolution, but more than tinkering. It is too great a challenge for any one segment of society to undertake alone. Rather, creation of a High-Flex work force can be accomplished only by allocating responsibility among employers, workers, unions and government. We must create an American training and adjustment strategy to improve the skills and adaptability of U.S. workers - not a federal strategy but a broad-based approach involving employers, workers, and all levels of government. And we must eliminate the many obstacles that impede worker education, training, job access and mobility.
>
> Some actions will require collaboration, and virtually all will necessitate new

relationships among business, government, and workers. In combination, these efforts can go far in creating a High-Flex work force that can meet the future with competence, agility and confidence.

DEVELOPING SHORT COURSES FOR BUSINESS AND INDUSTRY

Susan Kryczka
Director, Network Northeastern
Northeastern University

Good morning, I would like to welcome you to this presentation on delivering short courses to business and industry. I am going to be talking about how we develop short courses, how we recruit faculty to teach them and how we market those short courses to companies.

First, I'd like to give you a little background about Northeastern University. We are, by some counts, the largest private university in the country. We have 13 locations in the Boston area, and our main campus is a mile or so away from downtown Boston. Northeastern has been in operation since 1898, and our tradition has always been to deliver programs, credit and noncredit, to part-time workers, to people who need a non-traditional way of obtaining their education. Northeastern provides undergraduate, masters and Ph.D. programs. Now let me tell you a little bit about Network Northeastern.

Network Northeastern is the interactive instruction network of Northeastern University. Since the late 1960's Northeastern has used ITFS microwave channels to broadcast live courses from its Boston campus. We began broadcasting a complete masters degree program in Electrical and Computer Engineering in 1983, and in 1985 we expanded our programming to four channels. We currently offer four complete masters degree programs via the network, three out of the College of Engineering and one from the College of Computer Science. We also offer very extensive undergraduate engineering technology programs every night of the week and all day on Saturdays. We are a bit unique in that we are broadcasting eight undergraduate courses on Saturdays--four in the morning and four in the afternoon. In addition we have, since 1985, been broadcasting nine credit courses from the State of the Art Engineering Program. I'll talk a little bit about that later, as they have been a source of a lot of the noncredit short courses that we have developed not only for our local population, but also for our burgeoning national population.

On the noncredit programming side, we are the local distributor for the live IEEE (Institute of Electrical and Electronic Engineers) conferences that are offered via satellite. We downlink those programs and distribute them to our local companies.

Northeastern also produces noncredit shout courses for local and national distirbution, and we are one of the bigger providers of satellite-delivered short courses to the National Technological University (NTU). We typically do one or two day short courses because it seems to be a good format that works for NTU and for our local industry.

Four times a year we distribute a catalog, or schedule, of all courses available from Network Northeastern. The schedule is part of how we market the programs, and it includes both credit programming and noncredit short courses. For the short courses, we indicate the speakers and their background, the audience or the intended audience for a program, an overview of the program, and then a fairly extensive description. This seems to work well. It answers most of the prospective students' questions, and they have it all on one page, in one schedule. You will see that this is the same sort of thing that NTU also provides. The only difference between what NTU provides and what we provide to our local customers is that we have a cost indicated at the bottom of each description. NTU has a separate cost sheet that it sends out to its corporations.

The schedule goes to our local sites. Students who receive it are on a mailing list, or they get it from the corporate liaison or our company contact person at each site. The students can register through their corporation. All the billing and that sort of thing is handled through our company site coordinator.

In addition to the course schedule, we also put out posters. For example, we ran a series last fall on Employee Appraisal and Performance. It was a series of five programs done by a faculty member in our College of Business at Northeastern. We produced one poster that described each of the individual programs. We distributed it not only to our local corporations but also to the national sites. NTU provided an extensive listing of corporate subscribers, and we sent one of the posters--one copy that is reproducible--to their remote locations.

Occasionally we produce a poster which has a blown up, more extensive description of an individual course and a "coming attractions" in the corner. One particular program was Modern Spectroanalysis, and to get people ready or thinking about upcoming programs, we ran future course topics in the corner.

I've pointed out what we do in terms of individual marketing to our corporations. What NTU does is to produce a fee schedule, and this is important because the fee schedule lists all the short courses that NTU has, the duration of those short courses, and the cost. When I am trying to set the price for short courses--if you've never been in this business before, and we have only been in it for two years or so--I try to see what everybody else is offering, and what other universities are charging per registrant and for the site fee. This is a good kind of visual gauge. If you are going to be developing short courses and you don't know what to charge as a price, you might want to see what other people charge for the same kinds of courses. I've noticed that over the past two years all of the universities seem to settle into the same general price area. The fee schedule available from NTU is a good way to see what the going price is nation-wide for a short course.

What I would like to do now is show you a short videotape of some segments from short courses that we broadcast. The videotape first gives you an example of an adjunct faculty member teaching a course in semiconductor technology, and the other three examples are short courses taught by tenured faculty at Northeastern University. This, I think, gives you an example of how people are using different techniques for teaching. I think it also shows you that no matter which faculty member, consultant, or instructor you use for a course, the medium will allow you and that faculty member to pretty much do what is most comfortable, although there are certain constraints.

VIDEOTAPE

Course 1: Let's talk a little bit about the course. First of all let me say one thing, those of you out there at the remote sites, please feel free to ask questions at any time. I'd like it to be informal, so if you have any comments to make or any questions, go right ahead. There is a microphone here, and I'll respond.

Okay, how about the course itself. Well, it's introductory in nature. My objective is to teach you the basics of semiconductors, semiconductor materials, semiconductor devices and finally what are they used for or how are they used in computers and other electronic systems. So, the course is broken up, as you notice, into five one hour segments, approximately. We will start by introducing you to the concept of the semiconductor.

Course 2: We can combine them by using a set of connectors. And the set of connectors are "and" and "or". At the beginning you often have trouble distinguishing between the two. Just think of "and" as being A as in the beginning of the word and with that center line removed. For those of you who are Latinists, you know that the word for "or" in Latin is vel and that is where the V comes from.

Course 3: You look over the turnover data of last year, or you look at the turnover data for the last two years, and you say "Gees we seem to have a problem with turnover here. Maybe we should do something about this." Let's say you think it through some more and say "What might be causing this turnover?" Well you might say "perhaps its employee dissatisfaction." Dissatisfaction (tap-tap-tap-tap) is what leads to turnover. So again you're thinking it through...

Course 4: Could be in the case of exponential decay. This could be the dominating factor which controls the rate of decrease of exponential decay. So X is the signal that we either want to estimate some of its parameters or we may want to reconstruct this signal entirely (X of N). But the signal is unbended and this is what we actually observe (Y of N). Now one can think of one of the two following cases. Case one, for example, is a case where the signal can be ...

Susan Kryczyk: The tape gives you an overview of some of the programs that we have recently broadcast. What I'd like to do right now is go to an interview that we did with one of our faculty members that I think you might find helpful. You can look at short courses and their technical aspects, but if you can't find somebody that can teach on TV, I think you have a problem. So what we did was ask one of our faculty members, Raul Smith, who is with the College of Computer Science at Northeastern, to tell you why he decided to get involved in doing a short course with us.

INTERVIEW

Raul Smith: I became interested in doing a short course on TV through my previous experiences giving courses locally on TV. This was an opportunity to give a condensed version of a course that I had already prepared so it didn't require much additional preparation for this new environment. It also gave me the opportunity to get more exposure locally and nationally and the chance of increasing my consulting. So I was quite pleased to do it. There isn't much additional work if you you have done something similar before, let's say, or you are used to a teaching environment. Even if it is additional work for the moment, it has a long-term effect on your work in the standard classroom.

In my particular field of artificial intelligence, including knowledge representation and natural language processing, neither of which is perhaps a real hot seller, there was a tremendous amount of interest. The TV course went well, and there was good interaction via the telephone so it was like having a live student body in front of me. In addition the money was good. I think the potential for added money in consulting was very good. My advice to a faculty member considering doing television is to jump at the opportunity because it is a chance to get exposure nationally as well as locally. It is also a way of smoothing out any rough edges on an existing course. If you are thinking of preparing a course from scratch, remember that these courses can be used over and over again.

You will be asked by the producer to give a schedule of what you will be teaching when, hour-by-hour normally. This tends to give you some focus which you may need in terms of spreading out the material or condensing it. In addition it is a different kind of environment. It's more structured and requires you to be a little bit better prepared than you would be for a routine classroom situation. In particular I would suggest that you make very good overheads. TV gives you the opportunity to bring in lots of things you couldn't bring in normally, such as illustrations, pictures, videotapes, some kind of interactive "sit-around" environment. All of these can be part of your class. It is almost, in effect, an interactive class since you are standing there presenting the course and you have a large audience. It is a very positive experience.

Susan Kryczka: Following up on what Raul Smith said, how do you recruit faculty to teach short courses? Well, the first thing that I look for is industry experience. We are lucky being in a major metropolitan area here. We have faculty members that are tenured faculty and also adjunct faculty who are doing a lot of short courses on site for corporate training. These people are usually doing courses that industry has already expressed an interest in. They have also been talking to industry fairly recently so they can give you a better idea of what the hot topic is out there. The next thing that I would look for is faculty members or adjunct faculty who haven't worked in industry but are doing consulting. People who consult on a regular basis can give you some leads on hot topics and important training issues facing corporations. The other way to find faculty who know what's going on is through funded research. At Northeastern there are departments, for instance in signal processing, that have received a lot of corporate funding. I have spoken to the industries that are funding those departments and to the faculty members to see what topics we can develop for future short courses.

Let's review some of the sources in terms of how to find faculty for short course presentations. First, there's continuing education adjunct faculty. At Northeastern University we have been fortunate for the past 25 years to have a department known as the State of the Art Engineering Program. They offer about 120 courses each quarter that are noncredit professional development programs. They also offer on-site training. I contact them fairly regularly to find out what courses they are offering on-site and whether or not they have any adjunct faculty member who would like to teach a program via satellite via Network Northeastern. They have been extremely helpful. If you have such a program at your university or college, I would urge you to contact them because they may be sources for faculty and topics.

Another source is deans and departments. One of our associate deans in the College of Business has put me on to about four or five faculty members who are willing to do short courses. Most of them are already consulting, not only nationally but internationally. It was a wonderful find, and I will be forever thankful to that person. So check your department heads and your deans in terms of what faculty members are out there doing courses.

A third source of faculty or topics is administrators, not only in the university but also at the corporation. A couple of years ago some companies came to us and said "we really need to have a program in Ethics. Can you find somebody to teach such a thing?" Short course topics can come from companies who contact you, and I keep my eyes and ears open to companies who need training. Another great source is your corporate clients. For example, our company liaison at one of our companies teaches a course on "Risk It" and how to risk for personal and professional change. He had been doing this program in-house for a long time, and he called us and asked whether or not we would be interested in broadcasting it locally and even via satellite. We ran a one-hour program called "Risk it" last spring and it was very successful. So don't ignore your in-house trainers at a company. They can be a source of many programs for you.

One of the things that Raul Smith talked about in his tape was what would encourage a faculty member to participate? Once you have a topic or an idea you have to sell someone on it. What are the advantages? The notion of becoming a satellite star really does appeal to a lot of faculty members. That nation-wide audience has a real appeal, and there is the possiblity of making some money. Program development opportunities for faculty members who want to see what a program is like and develop it for TV and for satellite delivery allows them the advantage of putting together a program that they can use at that point and then sell on-site. So it works out quite well for them.

What about short course pricing? One of the things I mentioned earlier is take a look at what the market will bear. The NTU cost list is a great source of information. I would get on the mailing list of anyone who is giving short courses--not only universities but also professional societies--and see what a typical one or two day program is costing. Also think about the cost of flying people in, putting them up in a hotel, feeding them, and gauge your pricing on the amount of time and money that is saved by viewing the videotape or satellite delivered program.

Hypertext: A New Way of Accessing and Organizing Information

Greg Kearsley, Park Row Inc.

Hypertext is an idea that could dramatically change the way we use computers. It introduces a new way of accessing and storing data. Instead of reading through information sequentially, you can move rapidly from one part of a document to another by means of links. The information accessed by a link could reside on a system or machine located anywhere. Computer networks make the physical location of the information transparent. Hypertext is about connectivity, within or across databases.

In the context of distance education, hypertext offers a more powerful way of using computers to learn things than traditional forms of computer based instruction. By turning students loose with a hypertext system, you are letting them decide how they want to structure the information to be learned since they choose their own pathways. When you add a high capacity multimedia storage medium like CD-ROM to such a system, you get hypermedia. Now the links can produce text, graphics, photographs, video or audio sequences.

Links

Since links are the key element of hypertext, let's examine them for a moment. In its simplest form, a link is an association between two pieces of information in a database. Links are usually signified as highlighted words or phrases; when you select them, the program displays the information they are linked to. This might be another text screen, a graphic, or a multimedia sequence. Links don't have to be text, however. For example, you could touch some part of a graphic such as an illustration of a house or engine and the system would then show you a more detailed illustration of the part you touched. Similarly, you could touch something on the screen and a sound or oral explanation would result.

Links can do other things than simply branch you to another place. When activated, a link might elaborate the current text to provide more detail. Alternatively, notes might temporarily pop up on the screen and disappear after you stop touching the link. Links can also be programs and perform some sort of calculation or operation. For example, an "email" link might activate a modem, dial up your email system, and let you know if you have any mail waiting. A "make pizza" link might turn on the microwave, put a frozen pizza into the oven, set the timer, and then display a message on your screen when it's done. (Just checking to see if anyone really reads these papers.)

Browsing

We're all familar with the concept of browsing when we go shopping. Hypertext makes it possible to browse through a database. This means that the hypertext user can simply jump from idea to idea following the links provided. Prior to hypertext, the only way to examine a database is to either look at all information in a sequential fashion or to search using keywords or string matches. While the latter capability is desirable when you are trying to find something quite specific, when a person is learning they normally are not looking for anything in particular but trying to learn how concepts are related. This is what makes browsing so well suited to educational activities.

In order to browse comfortably, certain capabilities are desirable. For example, it is important to be able to back up, i.e., go back to the link you have just come from. More generally, it is important to have some sort of path history capability that shows you where you have been in the database and lets you return to a previous point immediately if you wish. It is also desirable to have sort of map that shows where you are in the database in terms of neighboring links and concepts. Electronic bookmarks are also handy -- they allow you to "mark" screens (typically by adding them to a list or giving them your own name) so that you can find them quickly later.

Applications

What can you use hypertext for? Anything. Trust me on this; it works on any kind of online document or database. For education applications, the most obvious document is an electronic textbook or student workbook. Instead of having to start on page 1 and read from page to page, students can zip around exploring the subject matter. They can make notes as they go provided that the hypertext system allows annotation. You could create links to simulations, exercises, or reference materials for students to pursue if they are so inclined. As long as its in electronic form and accessible via the system, you could build a link to it.

Clearly hypertext/hypermedia has tremendous potential for encyclopedias, dictionaries, catalogs, and technical manuals where a lot of cross- referencing is involved. Imagine a foreign language dictionary where clicking a term produces its pronounciation or a film catalog where a click produces a preview. Technical drawings such as blueprints or schematics can show multiple levels and perspectives. Less obvious are applications for arts and creative writing. For example, hypertext has been used to write interactive novels where the reader selects the next twist of the plot. If distance learning materials are delivered in electronic form, either as software or CD-ROM, they can take advantage of hypertext capabilities.

Authoring

Alas, all of these wonderful hypertext databases do not emerge from the computer overnight when nobody is watching. They take an enormous amount of time to design, create and debug. As an author, you have to think about a subject matter and decide what links to create and how they should work. You have to make decisions about screen design, input modes, and document sizes. Many of these decisions will be constrained by the particular hypertext system you use (e.g. what types of links are possible, what types of input, what types of graphics). In addition, the system used will determine how easy and quickly you can create your database.

In most cases, you will be using a set of different software tools to create a hypertext database. For example, you may create text or graphics using a word processor or graphics editor, respectfully. You may use a scanner to convert existing illustrations or text into electronic form. If you are collaborating with other authors, you are probably going to use telecommunications program to transfer files or exchange ideas. Finally, you will use a hypertext authoring system to place the links and create a run-time program. Needless to say, authoring electronic materials involves quite a lot of involvement with the computer. Love it or leave it.

Hypertext Systems

There are many hypertext systems available for different computers. HyperCard which runs on the Apple Macintosh personal computer is by far the most popular hypertext system in use (although ironically it was not specifically designed to be a hypertext system). There are dozens of hypertext systems available for IBM PCs including AskSam, Black Magic, Houdini, Hyperties, KnowledgePro, Linkway, and many others. There are also multi-user hypertext systems that run on Sun workstations as well as many research systems such as Augment, Intermedia, NoteCards, and Xanadu. For details on these systems, see the references in the Bibliography.

There are many limitations with current systems. One major limitation is that hypertext systems tend to be self-contained and do not make it easy to move information between other applications. Many hypertext systems do not provide very good printing capabilities. The annotation and browsing features of some systems leaves a lot to be desired. The systems that run on personal computers do not usually support any networking features, which are a critical element of a full-fledged hypertext system. Of course, it is just a matter of time until these limitations are remedied. None of these limitations should prevent educators from using hypertext systems to good advantage now.

Prospects

As with any new technology it is hard to predict what kind of ultimate impact hypertext will have. However, most software developers have been quick to adopt hypertext features in their new programs. Hypertext has been especially visible in the CD-ROM area with most CD-ROM access programs using some form of hypertext interface. As the database or program gets bigger or more complex, the more valuable hypertext seems to be.

As far as distance education is concerned, hypertext seems to be an ideal way to present information to students that they can tailor to their own interests. It has all the interactivity of conventional forms of computer based instruction but without the simple-minded instructional strategies that most students and instructors find annoying and counter- productive. In addition, the use of CD-ROM allows a lot of multimedia course materials to be distributed in a convenient and cost-effective fashion. With hypertext providing an easy way to access the huge amount of information that can be stored on CDs, what more could you ask for?

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SITE COORDINATION AND SUPPORT SERVICES

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I. INTRODUCTION

Distance education research has documented that adults can learn just as well at a distance as they can in a classroom. (Weingand, 1984) However, there is also interest in how students can be better supported in this learning process. (Burge, Snow, and Howard 1988) This literature is generally written from the institutions' perspective of what the students need. (Paul, 1988)

Perhaps not surprisingly, therefore, a recent survey (Nelson & Minore, 1988) of a sample of communities in northwestern Ontario found that residents perceived their influence on the decision making process of institutions to be low. They wanted a higher level of community involvement in the design and delivery of post-secondary education in their communities. According to the study, "ninety-one percent of Northwestern Ontario residents want input into what courses are offered in their communities." In stark contrast, "at the college and university levels, less than 20 percent of Northwestern Ontario residents perceive that they can effect decisions made about course offerings."

This paper uses a collaborative distance education project in Ontario as a point of departure for examining two issues:

1) the challenges in recruiting, training and supervising remote site coordinators, and
2) the community based learner support that such coordinators can provide.

These issues are examined from two perspectives: that of a project administrator and that of a site coordinator.

II. THE SETTING

Contact North/Contact Nord is a 4 year pilot project, started in 1986 by the Government of Ontario. Its primary objective is to improve immediate access to formal educational opportunities at the secondary and post-secondary levels for residents of Northern Ontario.

Thirty-two communities have had an access site established in either a community college, secondary school or other public facility provided by the community. Each is an "electronic classroom" equipped with an audio-conferencing unit, Telewriter II, IBM and ICON computers, (each with a modem and printer), facsimile machine and VHS playback and monitor. Any Ontario university, community college or school board may book one or more of these sites to offer courses to students. Each site has a distance education library consisting of calendars from as many institutions as possible.

The 32 sites are divided into two regions and are managed by one of two Regional Coordinating Centres in Thunder Bay and Sudbury. They, in turn, are managed by a partnership of one college and one university, with each partnership having an identical letter of agreement with the Ontario Government. In Sudbury, Laurentian University and Cambrian College are the contractors; in Thunder Bay, Confederation College and Lakehead University collaborate.

Each access centre is staffed by a part-time site coordinator who is recruited, trained and supervised from the appropriate Regional Coordinating Centre (RCC). The site coordinators have two major areas of responsibility:

- to act as an information broker about distance education opportunities at all educational levels: secondary and post-secondary, formal and informal.
- to facilitate classes when the Contact North/Contact Nord site is booked by an institution: e.g., opening the building and classroom, turning on equipment, showing new students how computer and audio conferencing work, etc.

These two tasks, as well as other related ones, must be accomplished by part-time personnel who are restricted by the Government to a maximum of 20-28 hours per week.

III. REMOTE PERSONNEL ADMINISTRATION

Because of a very tight schedule for project start-up, the distance mode was used for a number of activities that might otherwise have occurred face-to-face.

A. Recruitment

In the northeast, the initial site coordinators were hired in July 1987 in face-to-face interviews. Most subsequent replacements have been hired on the basis of telephone interviews using supplementary print materials such as application forms, resumes, references, etc. This recruitment process has been successful, partially due to the fact that the out-going coordinators have helped to "select" their own replacement. There is, however, a public competition and multiple candidates are interviewed.

B. Training

There are two face to face training opportunities for the coordinators:

1) an annual seminar to motivate, train, and build group rapport, and,
2) a visit from the Network Coordinator at least once during the year. New coordinators come to the RCC for one day as soon as they are hired.

One major challenge in training the coordinators at a distance has been raising their level of computer literacy. After an August 1987 in-person training seminar, the coordinators did all the hardware and software set up when they returned to the community. The written diagrams which they had received at the seminar were supplemented by audio conferences. Individual problems were handled by telephone tutorial sessions. Subsequently, in response to requests from the coordinators, Cambrian College has successfully offered both a beginner level and advanced Wordperfect course at a distance. Print, audio, computers and Telewriters were all used in this multi-media approach.

RCC staff meet with coordinators on a weekly basis for sessions that combine both training and administration. In the first several months of the project, there were 1 hour weekly audio conferences. For the past months, the audio conferences alternate with computer conferences. In addition, the facsimile machines are used almost daily and checking for computer mail is a mandatory daily function for both RCC staff and coordinators. Since the coordinators did not find that any of these technologies offered them enough individual support, RCC staff have experimented with various strategies to make themselves more available. The most recent tactic is to specify two mornings a week when coordinators may telephone for help.

The training component of these weekly audio and computer conferences covers almost every aspect of the project. Some specific examples include:

1) ongoing training on all technologies used in the project,
2) information meetings with institutions to update coordinators with material not included in the regular calendars, and
3) information on courses to be distributed to the sites, such information to supplement detailed written course booking forms sent by facsimile.

C. Supervision

Supervising staff who are remote from "head office" and who must provide a reliable community service has proven less of a challenge than originally feared. On the few occasions where a coordinator has failed to appear to facilitate a class, the host institution has been able to serve the students. Such a major failure in job performance has usually been signalled by other internal matters such as failure to check computer mail regularly. Major problems in job performance and the need for rapid termination have been mutually agreed to and handled fairly smoothly.

The more difficult challenge has been morale. Contributing factors include the isolation as a lone-employee, the part-time and irregular nature of the work hours and the lack of frequent personal contact with RCC staff. Trying to find a suitable compromise between the needs of the coordinators and the constraints imposed by limited RCC staff availability and budget is the subject of constant ongoing dialogue. It is interesting to note that similar problems of isolation are often cited in the literature about student support services in distance (Paul, 1988).

D. Conclusion

Community based access sites and locally hired site coordinators provide one means of helping students overcome their sense of isolation and limited personal contact with their institutions. Contact North/Contact Nord combines both technical and human resources to form a distance education network. To compliment the management issues explored above we will now turn to a specific community case study. This will serve to illustrate the community services provided and the dynamics which take place during the day to day operation of such a community site.

IV. THE FORT FRANCES COMMUNITY SITE: A CASE STUDY

Fort Frances (1986 population 8,870) is situated in Ontario, directly on the Minnesota border and 144 kilometers from the Manitoba border. The nearest University/College town (Thunder Bay) is 355 kilometers away. Distance Education is therefore the only option that many residents have in pursuing post secondary studies.

Some examples of student support services that the Fort Frances site coordinator has been involved with during the past two years follow.

A) "Students Voice", is a computer conference for northwestern Ontario distance education students that was created by Christine Blackburn, the Site Coordinator in Kenora, Ontario. Started in response to feelings of isolation expressed by the students, "Students Voice" tries to create a virtual school spirit amongst distance education students in northwestern Ontario. The conference has three topics: "news", "views" and "blues".

To date, students have used the conference to exchange biographical information; sell textbooks; comment on teleconferencing as an instructional method; discuss the lack of graduate distance education courses available in Canada; discuss how to handle a particularly difficult examination; and identify other student support services. The possibility of having student academic counsellors (from various institutions) available on line has been raised and is now being looked into by Contact North/Contact Nord staff.

B) The site operates as a concrete setting where students can meet and network. At Fort Frances, there is a guest book where interested students list the courses they are, or will be taking, and leave names and telephone numbers. Potential students have called current or former students for information on the particular course or institution they are considering enrolling with. Their networking has resulted in students exchanging textbooks, and discussing course content and delivery methods. The site also has several bulletin boards that students have utilized to list texts for sale, typing services, and upcoming local events. The site is available for students who wish to: work on computer tutorials; type their own papers; meet other students for coffee and conversation; work on independent studies; view video tapes, and/or log on to "students voice" and talk to fellow students who are geographically distant.

C) "The Friends of Distance Education" student support group was formed in Fort Frances as a result of a conversation with a student who stated that "distance education means doing all the work that goes along with the university or college experience - but missing out on all the fun!" The group, of about twenty-five distance education students, meets once or twice a month, sometimes at the Contact North/Contact Nord site, but more often in a local restaurant or pub. Spouses are welcome and often congregate to commiserate over the experience of living with a student. There are regular monthly gatherings but also special meetings after exams, before the beginning of a new term, and as requested by members.

Although the role of a community based site coordinator is varied, and is continuously growing and changing, the Fort Frances experience indicates that it can include acting as a catalyst for non academic student participation and interaction.

V. CONCLUSION

The addition of site coordinators to an electronic highway such as Contact North/Contact Nord has been crucial to the rapid acceleration of the project from 0 facilities and 0 courses in June 1987 to 32 sites and over 100 courses in June 1989. Even working part-time, the 32 coordinators generate over 3,000 inquiries and/or visitors every month. Contact North/Contact Nord offers distance educators a model of increased community based student support that may be relevant in other contexts. In using distance management techniques, however, RCC staff are constantly trying to devise staff support techniques that minimize the sense of isolation felt by site coordinators. It would be a supreme irony if the site coordinators, in solving the students' sense of remoteness by being available in the community, suffer a similar sense of isolation and lack of personal contact with their own "institution".

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Coordinating the Use of Cable Technology in Oakland County, Michigan

Presenters:

Linda O'Donnell, Video Services Coordinator, Oakland Schools
Mary Gholz, ITV/Cable Coordinator, Clawson Public Schools

Oakland Schools is an intermediate school district serving the educational needs of the 28 local school districts in Oakland County. The intermediate school district provides clinical, consultative, data processing, and teaching services in addition to operating four regional vocational centers under contracts with the local school districts in which they are located. Oakland Schools encompasses 925 square miles, and includes 360 public and 120 non-public school buildings.

During the past several years, Oakland Schools has coordinated the construction of an educational institutional network (I-NET). In the near future, Oakland Schools will act as the hub for the K-12 community as the network encompasses over fifty municipalities franchised to seven cable television companies. Presently in Oakland County there are over 75 buildings in nine school districts utilizing I-NET for data and voice transmission. Additionally, there are 14 districts able to receive Oakland Schools instructional television (ITV) schedule. The network is fully capable of two-way audio, video, and data transmission. These school districts have chosen to do telecommunications over I-NET because the medium works very well and the network is extremely cost-effective.

This session is designed to focus on the relationship between Oakland Schools and the K-12 Cable Consortium, the coordinating body for the educational activities of seven school districts in an 11-municipality franchise agreement in southeast Oakland County. These seven districts, namely Avondale, Berkley, Clawson, Ferndale, Rochester, Royal Oak, and Troy, service 45,354 students, approximately 26% of Oakland Schools constituency. During the summer of 1988 these seven districts were interconnected to Oakland Schools, a task made difficult because Oakland Schools was geographically outside of the franchise area. For 30 weeks (October 3, 1988 through May 26, 1989) Oakland Schools and one of the seven school districts, Clawson Public Schools, have been piloting the transmission of instructional television programs, national teleconferences, and distance learning activities.

Achieving these transmission activities required collaborative effort between the school districts and Oakland Schools. To effect such collaboration and bring it to bear on meeting the educational needs of Oakland County schools, a Video Transmission Advisory Committee was organized which includes one representative from each cable company, the Oakland Schools Video Services Coordinator as chair, the Oakland Schools Telecommunications Consultant, and the Oakland Schools Research and Evaluation Consultant.

The tasks of the Video Transmission Advisory Committee were as follows:

1. The Committee helped design the operational plan for the pilot district and the succeeding districts.
    a. Twenty-five hours a week (five hours a day) of programming was chosen for the 1988-89 school year.
    b. Logistics were developed for altering programming or repeating content.
    c. An evaluation and user survey was developed to ascertain the strengths and weaknesses of all aspects of the pilot project.
2. The Committee keeps the districts informed of all activities included in the project within the same cable company.
3. All members use electronic mail for
    a. receiving weekly and monthly schedules of transmitted programming,
    b. sharing information regarding the pilot project.

Presently Oakland Schools has over 2,500 separate instructional video titles in its library which have duplication and I-NET rights. Oakland Schools increases its collection by 10% each year. Prior to the I-NET, local schools would borrow instructional video from Oakland Schools lending library or purchase duplicated copies. A goal of this pilot was to provide a cost-effective manner of transfer. Clawson was able to use 750 hours of Oakland Schools programming to amass the following collection:

1038	instructional video titles
32	teleconference feeds (three teleconference feeds for which Clawson was a host site)
1	one-way video/two-way audio distance learning activity
1	two-way video/two-way audio distance learning activity
1072	total video titles

The savings to the district was over $4,000 in duplicating costs.

On October 28, 1988, Clawson teachers received Oakland Schools first live one-way video/two-way audio transmission for their staff development day. The featured speaker, Dr. Christopher Dede, is a nationally recognized futurist. The first live transmission was deemed a success by Oakland Schools and Clawson's staff.

On March 16, 1989, Clawson hosted the first two-way video/two-way audio live three-hour workshop "AppleWorks Question and Answer" from Oakland Schools. Oakland Schools is pursuing distance learning to reach larger audiences. This cablecast succeeded on both personal and technological levels. Evaluations of the workshop were very favorable. The technology did not hinder a responsive interactive meeting. In fact it became very clear that within minutes most of the participants appeared to forget that the instructor was not in the room. The focus of the instruction was the content, not the logistics of sending the signal.

Evaluation of the pilot indicated the following information:

In Clawson, the Board of Education has allowed freedom in planning a network that allows for growth and expansion as technology changes. Also, they are communicating beyond Clawson to provide their students with the best instructional video available. The district is willing to commit their resources to tap into the resources of the county. Information is the key and they have found a successful means of obtaining it.

Clawson, based on student enrollment, is a small district, but it uses its personnel wisely. Anytime you talk of technology there are a variety of problems and alternate solutions. The identification of a key group of personnel who are willing to examine the possibilities, present plans, and follow through is imperative. In Clawson, the design and building of the I-NET has been coordinated by the Computer Services Coordinator. This is a logical approach since many of the potential uses of cable television relate to data transmission. The Middle School Library Media Specialist, who is also the district ITV/Cable Coordinator, coordinated not only the downloading, organization, maintenance, and circulation of the video collection, but also its incorporation into the collection, a logical extension of library media services.

The following question from the teacher evaluation indicated the success of the pilot:

> Please respond to the following statements.
>
> Circle T if the statement is true for you, or circle F if the statement is false.

		T	F
a.	There are instructional video programs which meet my curriculum needs.	95.3%	4.7%
b.	The transmitted video is taped and available to me in a timely manner.	74.4%	25.6%
c.	A VCR and monitor are available to me.	95.3%	4.7%
d.	Equipment is in good repair.	95.2%	4.8%
e.	I know how to operate the VCR.	97.7%	2.3%
f.	The taped programs are clear.	93.0%	7.0%
g.	Instructional video programs have educational benefits.	100%	0.0%
h.	The schedule of what will be transmitted is available early enough for planning.	87.2%	12.8%
i.	My school district encourages me to use instructional video.	92.7%	7.3%
j.	My principal encourages me to use instructional video.	82.1%	17.9%
k.	My students like instructional video.	97.6%	2.4%
l.	The Oakland Schools Video Services Coordinator has provided helpful information.	100%	0.0%
m.	My district video coordinator is helpful.	97.6%	2.4%

n. Before showing the instructional video lesson:		
1. I discuss the objectives of the lesson with my students.	90.5%	9.5%
2. I present vocabulary and review the material necessary to understand the video lesson.	80.5%	19.5%
3. I develop student interest in the lesson.	95.1%	4.9%
4. I give the students specific points for which to look and listen.	95.1%	4.9%
o. During the lesson:		
1. I take an active interest in the lesson.	97.6%	2.4%
2. I observe students, keeping alert to reactions indicating a need for re-emphasizing points made by the program.	95.2%	4.8%
3. I lead responses when called for by the program.	97.5%	2.5%
4. I use the pause button when appropriate for discussion.	60.0%	40.0%
p. During the follow-up:		
1. I give students an opportunity to discuss points of interest and ask questions.	100%	0.0%
2. I make assignments involving different kinds of study skills.	66.7%	33.3%
3. I extend the lesson through discussion and enrichment.	92.9%	7.1%
4. I encourage students to seek answers to questions raised through research and independent study.	76.2%	23.6%

Cable technology provides a solution for having immediate access to an in-house instructional video library; access to subject matter experts or career role models not otherwise available; access to interaction, joint activities, and the sharing of information with students and staff in other schools within a district or in other school buildings in Oakland County; and increased opportunities for staff development and inservices training. Oakland Schools capability to reach constituents via electronic media is rapidly expanding. The use of telecommunications to serve clients is no longer a technological fantasy.

Session Title: Telecommunications Instructional Consortium: *Waubonsee Community College's Interactive Television Program*

Presenters: Waubonsee Community College

Lynn Blakesley - Associate Dean of Learning Resources and Instructional Technology

Jane Regnier - Instructional Television Programming Manager

In the fall of 1988, Waubonsee Community College began operation of a telecommunications system that employs microwave technology to link the main campus of the college with four area high schools and the downtown college campus in nearby Aurora, Illinois. Waubonsee Community College and the participating high schools formed the Telecommunications Instructional Consortium (TIC) to facilitate expanded educational opportunities to high school students and to bring college credit coursework to additional locations throughout the college district. The programming is delivered to all sites through the use of a two-way, fully interactive microwave system. The instructor can see and hear the students at all of the distant sites. The students can also see and hear the students at the distant sites, as well as their instructor, who may or may not be, in their classroom. Currently there are six telecommunications classrooms. The college has a classroom at each campus and there is one classroom in each of the high schools. The TIC member high schools are:

Kaneland High School
Plano High School
Oswego High School
Waubonsie Valley High School

In 1987 Waubonsee opened an extension campus in Aurora, Illinois. Though the college district is quite large, the majority of our students reside in Aurora. Our main campus in Sugar Grove is seven miles from Aurora. With a full-time faculty numbering 80 it was difficult to have our instructors traveling back and forth during the day. One of the goals of the TIC system was to make our classes more accessible to the students in our district. During the day college credit courses are offered over the

TIC system between the Sugar Grove and Aurora campuses. An average of ten college credit courses are offered each semester during the day. Half of the courses originate at the Aurora campus and the other half at the Sugar Grove campus. Instructors are encouraged to travel and meet the students at the remote site at least twice during the semester. Course offerings include accounting, child development, criminal justice, data processing, English, health, history, math, psychology, sociology, and speech.

In the evening, college credit courses are offered at all six sites. The origination site can be any TIC classroom and receive sites can include one other classroom (point to point) or two to five other classrooms (point to multipoint). Evening courses make it possible for college students to attend classes in their local high school which saves travel time and helps the college offer extension courses without paying for extension sites. Historically, courses with an enrollment under 15 would have to be cancelled. By combining the students at the various sites, it becomes easier to reach the minimum enrollment required and fewer course sections have to be cancelled. In addition to the courses mentioned above, evening courses include ESL and GED.

Another goal of the TIC system is curriculum improvement for the member high schools. In the rural high schools, advanced math and science courses and multiple foreign language classes cannot be taught due to faculty size and student enrollment. Finding 10 to 15 students interested in advanced foreign language and math courses is often impossible. If each of the four schools in the consortium has three or four students interested in a course, it can now be offered over the TIC system. Each high school, pays the originating school for their share of the instructor's cost. During the first year of operation German and Japanese language courses were offered over the system. One instructor at Waubonsie Valley high school was able to teach German I to students at Plano, Kaneland, and Oswego high schools. Japanese was taught from Oswego to students at Plano, Kaneland, and Waubonsie Valley. The system works and the students were successful. A large part of the success of this type of delivery system can be attributed to the interactivity that microwave provides. High school programming for the coming year will be expanded to include German I and II, Japanese, and Calculus. High school students can also participate in the college courses that are offered during the day. This benefits juniors and seniors looking for additional courses and all students who are interested in a topic not offered at their high school.

The implications of this type of delivery system on curriculum expansion and cost savings are significant. Rural high schools are able to meet the state imposed graduation requirements regarding upper level math courses and foreign languages. One instructor can teach students at four or five different sites simultaneously. It means that an upper level math or science seminar class can be offered to high ability seniors regardless of the size, location, or wealth of their home high school district. The capability to fully utilize the talents of outstanding teachers in each academic area and expand the curriculum offerings of all high schools in the consortium is an important consideration—aside from the substantial cost savings to the participating schools.

The microwave system is also used to facilitate the delivery of satellite programming to the member high schools. Programming is received at a central downlink site and then disseminated to any interested high school. Satellite teleconferences which can be used for staff development can also be offered over the system.

Another important aspect of the system's success can be attributed to the strong support system that has evolved along with the technical development. Faculty interested in teaching on the system participated in a week long training program prior to the first semester of operation. Experts in the field of interactive distance education were brought in to share their experiences and teach the faculty how to use the equipment in the telecommunications classroom. The faculty had to prepare a mock lesson to be taught over the system and were critiqued by the workshop leaders and fellow participants. The next in-service workshop will be led by the faculty trained during the first workshop.

Each member of the consortium assigns a coordinator to work on scheduling, programming, and any other concerns that may arise. The coordinators meet every other week to discuss these issues. The college hired a programming manager to coordinate the master schedule and work with the faculty who teach on the system. An engineer was also hired by the college to oversee the technical needs and development of the system.

Document delivery is handled by a courier system implemented by the college. Homework and tests are picked up and distributed through this system. The average turn-around time is two days. Foreign language courses at the high school level require a faster turn-around time. In order to meet this need, facsimile machines were installed in each telecommunications classroom. The consortium members will continually seek new ways to improve and enhance the use of the system.

Plans for the future development of the TIC system are ambitious. The college is currently adding two additional classrooms to accommodate 29 college credit courses scheduled for the fall semester. Four additional high schools in the district are considering joining the consortium. This will greatly expand the curriculum opportunities available to the member high schools.

While the technology involved in the system is critical, it is the continued emphasis on instruction that has made the TIC system successful. Interactive distance education works. The Telecommunications Instructional Consortium has just begun to realize the potential of the system.

How to Develop Successful and Profitable Adult Education Certificate Programs

by

Glenn C. Hoyle Ph.D.
Director, New Product Development
CUNA Human Resource Development Department (HRD)

Introduction:

The STAR Program (Staff Training and Recognition) is a job skills training program available to credit union employees in America's 16,000 credit unions. The program is available through CUNA's state trade affiliates (called leagues) by correspondence, or through seminars and conferences.

The program is divided into two study and certificate tracks. There are six study modules to earn the STAR Member Service Certificate, and another three modules required to earn a Certificate in Consumer Lending. Each study module is accompanied by a 40 question (multiple-choice) test, a videotape, and an accompanying leader's guide.

Introduced in 1988, the STAR program has been a great success. More than 13,000 modules were sold in 1988 and more than 200 persons have been certified in the program. In 1989, sales of modules in the STAR program have continued at the rate of 2,000 modules per month.

Over the past ten years CUNA/HRD has made dramatic strides in the development of training schools, conferences, materials development, self-study and certification programs for credit union staff, managers, and volunteers. Certification programs, like the STAR program have successfully demonstrated that credit union people respond very positively to a structured, sequenced curriculum which gives recognition for learning achievements.

Yet, as the number of programs offered to credit unions has increased, and these programs have been successful, the demand for further structured educational programs has increased.

In addition to asking for more education and training programs, participants have also asked that the existing programs within CUNA/HRD be reconstructed and reconfigured to provide a comprehensive and integrated system for training and development in cooperation with our member leagues. This has opened up new opportunities for CUNA/HRD to develop further types of certification programs since the STAR program is primarily a "print-based" correspondence program.

Towards a Model of Program Development for Certification Programs

A major criticism of CUNA/HRD programs is that they are "unconnected" and lack a sense of instructional progression. One approach, based on the success of the STAR program is to develop a framework or master plan which shows how all CUNA/HRD programs relate to each other.

CUNA/HRD's programs and materials can be classified as their instructional/content level, the audience they are designed for, and by the methodology which is used to deliver the program.

The market for credit union training and development is growing and dynamic. Our participant's want to know what programs to take, the order they should take them, and the form of recognition they will receive for their efforts.

In addition, all of our programs are offered through our state trade affiliate "leagues" who actually market and deliver the programs in their states. It is their direct involvement which makes the programs of CUNA/HRD successful.

Job Identification and Clustering

There are three major training audiences in the credit union movement:

1. Leadership (Volunteers)
2. Staff (Employees)
3. Management

Within each of these training audiences, there are many different job positions and career tracks which individuals can take. For our programs to be effective we target our programs and materials to specific job groups and career clusters.

The training and development needs of these three audiences are different. In addition, participants want to study with their peers. Managers, for instance, prefer to engage in learning opportunities with other managers, and so forth.

It is our goal to identify the career positions within credit unions, and strive to develop our programs so that they become essential training and development requirements. We have already begun to see this trend with the VAP and the STAR programs. Several credit unions now require their volunteers or staff to take these courses as part of their mandatory training.

Methods of Study:

CUNA/HRD employs a variety of educational methodology. The main methods of study are:

1. Schools
2. Courses
3. Conferences, and
4. Materials.

These methods of study can also be classified as "credit or non-credit". Schools and courses can be considered as credit opportunities. Conferences and materials can be considered non-credit learning methods.

Materials are developed for use in courses, schools, and conferences.

Materials set forth the objectives and the content of "what" is to be mastered in a given learning experience. We also produce important "stand-alone" materials on basic and specialized subjects.

CUNA/HRD has only developed certification programs for its courses. This does not mean that successful certification programs cannot be developed using the delivery method of schools, conferences, or a combination of methodologies.

Content:

There are two specific considerations when we consider training and development content. First the level of content to be assimilated, and second the sequencing of that content.

There are three levels of content assimilation:

1. **Basic:** Skills and knowledge needed to do the job.

2. **Specialized:** Skills and knowledge needed to be fully competent in the job position.

3. **Ongoing:** Skills and knowledge needed to continue one's competency.

It is our goal to develop programs and materials so that a planned learning sequence is identified. Our programs should point an individual toward development, and developing one's career competencies.

Tracks:

We are long past the day when one program can meet all of the educational needs of our audiences. Educational tracks allow for the systematic presentation of specialized knowledge. The VAP and the STAR programs are already formatted into tracks.

Tracks define a sequence of learning activity. They allow participants to further define the learning path they wish to take. This is very important, especially when a learner is confronted with a large number of educational choices.

Summary

The following diagram illustrates how CUNA/HRD is conceptualizing a master plan of sequenced education for credit union staff. This diagram represents the elements which have been discussed in this brief paper. Such a system does not yet exist, but the need for it has been identified.

Certification programs have been very successful for CUNA/HRD. In the past year, more than 30,000 credit union managers, volunteers, and staff have participated in one of CUNA's certification programs. A master plan eduction takes the concept of certification programs one step further. It proposes a framework by which the individual certification programs can be related to each other, thereby strenghtening the whole educational endeavor.

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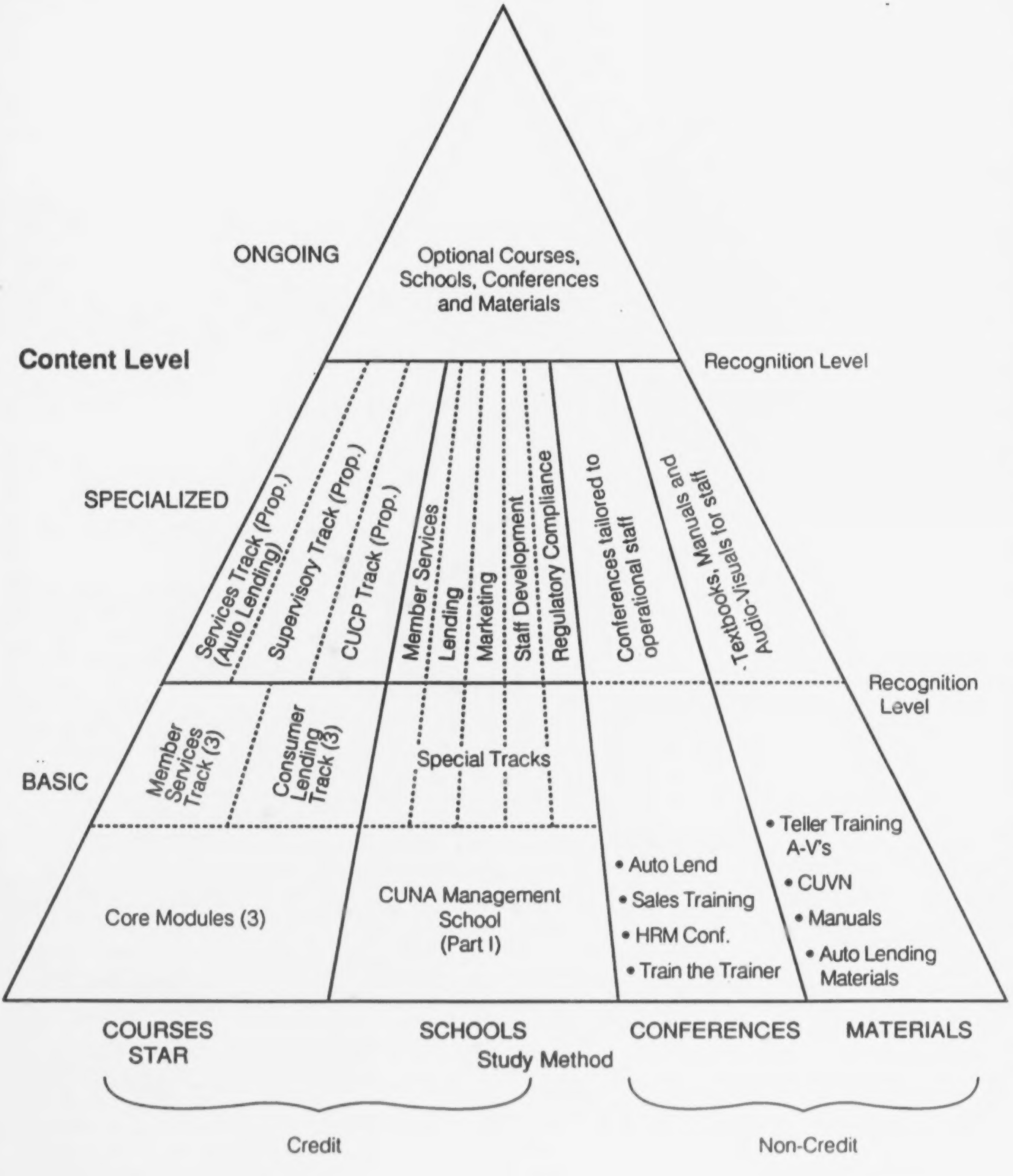
STAFF


ONGOING
Optional Courses, Schools, Conferences and Materials
Content Level
Recognition Level
SPECIALIZED
Services Track (Prop.) (Auto Lending)
Supervisory Track (Prop.)
CUCP Track (Prop.)
Member Services
Lending
Marketing
Staff Development
Regulatory Compliance
Conferences tailored to operational staff
Textbooks, Manuals and Audio-Visuals for staff
Recognition Level
BASIC
Member Services Track (3)
Consumer Lending Track (3)
Special Tracks
Core Modules (3)
CUNA Management School (Part I)
• Auto Lend
• Sales Training
• HRM Conf.
• Train the Trainer
• Teller Training A-V's
• CUVN
• Manuals
• Auto Lending Materials
COURSES STAR
SCHOOLS
Study Method
CONFERENCES
MATERIALS
Credit
Non-Credit

INDIA'S EXPERIENCE WITH DISTANCE HIGHER EDUCATION:
Indira Gandhi National Open University

Jay K. Miller, Ph.D
Ursinus College

The phenomena of distance education

There are many reasons for establishing Open Universities (OU's) and distance education programs. The reasons and the resultant institutional structures vary from country to country, and generally reflect different economic, political and social systems. In the more developed countries, such as the United Kingdom and the Netherlands, OU's were set up to give adults, especially those with employment and family commitments, another chance at higher education. While this reason is equally valid in the lesser developed countries, economic and development factors often play a larger role. More specifically, open university systems require fewer teachers to reach a greater number of students, thereby making it possible to educate more individuals than can be educated with the traditional method of face-to-face tuition.

The idea for establishing a national open university in India goes back to the early 1970's, just several years after the founding of the British Open University, one of world's first OU's. By the 1980's, the initiative had been picked up by several Indian states and, in 1982, the Andhra Pradesh Open University (APOU) opened in Hyderabad. After only four years of operation, APOU had 40,000 full- and part-time students enrolled in the various courses and programs. Open Universities have also been established in the Indian states of Rajasthan (Kota) and Bihar (Nalanda). The possibility of setting up other OU's in India has been discussed in the states of Gujarat, Kerala, Karnataka, Uttar Pradesh, Maharashtra, Orissa, and West Bengal.

Establishing a national distance education institution in India

The Indira Gandhi National Open University (IGNOU) was established in September 1985 by Prime Minister Rajiv Gandhi as one part of an overall plan for restructuring the Indian system of higher education. The existing educational framework in India is characterized by a limited number of institutions with high grade cut-off points for admissions , and, consequently, limited spaces for qualified students . In addition an emphasis on the traditional family structure in India oftens precludes many women from studying at an institution of higher education.

The legislation which officially created the opening of the university and which gave budgetary approval for its operations was passed quickly by Parliament and the first students were enrolled in 1987.

Setting up a National Open University in India was an undertaking of mammoth proportion. The Indian subcontinent covers an area of almost 1.3 million square miles (approximately one-third the size of the continental United States), and supports a population of just under 800 million, making it the second most populous country in the world. With an annual growth rate of 2.24%, it is projected that India will be the world's most populous nation by the turn of the century. And, with 40% of the population under 15 years of age, it is anticipated that the demand for higher education will increase significantly in the decades ahead.

While a popular image of India is that of an overcrowded urban environment, seventy-five percent of the population live in rural village areas. In 1984 the overall literacy rate in India was estimated at 40%. However, in rural areas the literacy rate was 41% for males and 18% for females and in urban areas, it was 66% for males and 48% for females.
In addition to the enormity of the nation, IGNOU planners were also faced with developing a national institution in a country which recognizes fourteen official languages besides English and Hindi.

IGNOU was seen by many as a means of democratizing Indian education and, in the words of the Prime Minister Rajiv Gandhi, "...[as a means to] extend educational opportunities to all corners of the country." Clearly in a nation of the size and diversity of India, the government had made a commitment to a massive undertaking. Although the structure of IGNOU was patterned after the successful British Open University, the British OU functions in a country with a population of 56.5 million in a total land area of approximately 94,000 square miles. Most all of the British OU materials are produced in one language. Therefore, IGNOU is more than just another Open University, it is an OU and distance education on an unprecedented scale.

IGNOU Structure

IGNOU's main facilities are located in the capital city of New Delhi. Presently, the operations are scattered throughout the city and its environs. While this had been cost effective during the start-up of the university, there is an acknowledged need to locate all the divisions in one facility. To this end the administration has initiated construction of a facility located near Saket, a suburb south of New Delhi. It is expected that this new centralized facility will be completed by 1991.

IGNOU operates on the local level through a network of Study Centers and Regional Centers. The Study Centers are the main point of contact with the students who are studying throughout the country. As of January 1988 there were 38 Study Centers in operation, and IGNOU anticipates having 300 Study Centers within the next several years. Most of the Study Centers have small libraries, audiovisual and computer equipment, and classroom and office space. Most are located in local colleges and universities with the college principal (the equivalent of a college president) appointed as Coordinator. Part-time tutors, who may or may not be on the faculty of local colleges, are appointed to work directly with the students.

The Regional Centers are considered sub-offices of the central university administration in New Delhi. They are responsible for coordinating university operations and supervising the Study Centers in their regions. Currently one Regional Center is in operation in the state of Madhya Pradesh (Bhopal), with two more being established in Orissa (Bhubaneswar) and Andhra Pradesh (Hyderabad). IGNOU eventually plans to have 20 Regional Centers in operation. Most will be located in state capitals.

IGNOU is committed to providing educational opportunities to all segments of the Indian population, including the disadvantaged. To achieve this goal the university has relaxed overall entry requirements and has allowed special admission considerations to scheduled tribes and castes, that is, specified groups who are identified by the government as deserving special consideration. New courses and programs have been developed which are of particular interest to specific groups, for example, the Certificate Course in Food and Nutrition which was designed as a special interest course for women.

Students are allowed to proceed through their courses and programs at their own convenience and pace as long as they stay within specifically defined parameters [see Table I for a listing of current courses by duration and requirements]. Also, unlike the conventional educational system in India where students have very little flexibility in course selection, IGNOU students are permitted to choose their courses from a range of disciplines.

Courses of Study

Decisions about which courses to introduce first were based on early needs assessment studies conducted by the University. One of the earliest offerings was a Diploma in Distance Education, which was deemed necessary to develop a pool of educational specialists throughout the country who could support the work and efforts of the Open University.

As of mid-1988 students could enroll in courses leading to Diplomas in Management, Creative Writing, or Distance Education; Certificates in Rural Development or Food and Nutrition; as well as a

Bachelor of Arts or a Bachelor of Commerce degree. Future plans include establishing Schools of Science, Social Science, Humanities, Management, Education, Law, Arts, Health, Agriculture, and Continuing Education.

Entry requirements vary for each of the current offerings. For example, to enroll in the Diploma of Management program, an applicant must have a degree and/or documented supervisory/managerial experience. For a Diploma in Distance Education, the applicant must have completed a master's or a professional degree. The Diploma in Creative Writing requires applicants to complete a self-assessment analysis and to submit writing samples. Admission to the Bachelor programs has different sets of requirements for the 10+2 and non 10+2 applicants.[1] Students can take up to eight years to complete the degree. [Refer to Table 1 for a listing of programs with admission criteria.]

TABLE 1
CURRENT IGNOU COURSES BY DURATION AND REQUIRED QUALIFICATIONS FOR ADMISSION

Course	Duration	Maximum Completion Period	Min. Age	Minimum Qualification	Minimum Experience
Diploma in Management	1 yr.	4 yrs.	25	Graduate	3 yrs managerial
				OR	
				non-graduate	6 yrs managerial
Diploma in Distance Ed	1 yr.	4 yrs.	nil	Masters or Professional Degree	nil
Diploma in Creative Writing	1 yr.	4 yrs.	25	nil	nil
Certificate Course in Rural Development	3 months	3 months	N.A.	for development officers	
Bachelor of Arts/Commerce	3 yrs	8 yrs.	nil	for 10+2	nil
			20	for non 10+2	nil
Certificate Course in Food & Nutrition	6 months	2 yrs.	20	nil	nil

Source: "Ekalavya", vol. 1 #3, March 1988. IGNOU, Hauz Khas, New Delhi, India

Although IGNOU is an Open University, not all who apply are admitted. The actual percentage of admissions varies considerably by program. In 1988, 98% (1480) of those seeking acceptance to the Diploma in Distance Education program were admitted, but only 50% (3717) of the applicants seeking acceptance to the Diploma in Management program were admitted. Almost 60% (372) of the applicants were admitted to the Creative Writing program and 75% (10,626) were admitted to the Bachelor's Degree Program in 1988.[2] Currently, the age of the student body ranges from 20 to 75, although most are between 30-35 years old.

IGNOU has been enrolling students for less than two years. Currently, most of the students are drawn from the urban areas of India where the first Study Centers were located. It is anticipated that the number of students will increase significantly as more programs and Study Centers are added, as more courses are offered in languages other than English and Hindi, and as more individuals become aware of the programs and degree offerings. It is projected that the Bachelor's Degree Program will enroll approximately 50,000 students by 1989. The newly added Certificate in Food and Nutrition will be offered in five languages--Assamese [Assam], Telugu [Andhra Pradesh], Gujarati [Gujarat], Hindi [Uttar Pradesh], and English [Union Territory of Delhi]--and will gradually add more languages in order to offer the Certificate to potential students in other states.

Curriculum and Course Development

Despite the recurring debate within the field of distance education that every institution need not reinvent the wheel when they develop a new course which has already been produced and distributed successfully elsewhere, the IGNOU staff and consultants have developed and produced almost all of their own instructional materials. As a result, these materials designed by the IGNOU course teams have the flavor of being produced in India, by Indians, and for Indian students. The idea of going to other OU's for materials was not a consideration for IGNOU, and makes little sense in a country which consciously avoids products and culture which are non-Indian.

Within India, there is an attempt to avoid duplication of any distance education course produced at any of the other distance education institutions. This is accomplished through a Coordinating Council which was established by the central government. All distance education institutions in India are represented on the Council which is chaired by the vice-chancellor of IGNOU.

Courses are generally developed from a discipline point of view; that is, the internal structure of the discipline is examined and then it is decided which courses are necessary for that curriculum. Links are made with other disciplines, for example, chemistry with math and physics.

Most of IGNOU's courses are developed using the course team approach. Teams consist of all faculty within a discipline, outside experts when necessary, and representatives of the educational technology staff including media producers. The teams examine all the material that could be included in the course, and then make decisions regarding what is to be included or rejected. After two or three meetings, tasks are allocated to each member. The writers generally draft about 500 words and then the materials are circulated for comment and discussion. Course writers also identify areas for possible audiovisual materials or experiments.

After all revisions are completed, the material is printed through IGNOU's Materials and Production Distribution Division. Although references are made in the material to other publications, the booklets are written to stand alone. Reference and audiovisual materials for the courses are placed in each of the Study Centers for student use. However, since many of the planned Study Centers are not yet operational, the reference and audiovisuals currently are designed as supplementary and are not fully integrated into the core course material.

Impact and Criticism

It difficult to assess any specific impact of IGNOU since it has been in operation for less than two years. Clearly, more Indians now have access to higher education. However, it is too early to note any trends about retention, completion, and drop out rates--persistent problems associated with most distance education institutions.

Criticism of the National Open University has been both external and internal to the institution. Many within India have expressed the concern that IGNOU will be regarded as a second rate institution, one that will be a "dumping ground" for those who could not gain access to the more traditional universities. Consequently, another concern is that employment opportunities for IGNOU degree holders will be limited. Faculty at some of the traditional colleges and universities have expressed concern that rapid growth of an OU will eventually siphon students from their institutions, causing high unemployment rates for lecturers. Criticisms of this type which focus on potential problems are difficult to allay.

Competition for admission to colleges and universities is particularly keen in India. There are not enough spaces available for all those who want access to higher education, so clearly, it can be expected that a number of students who may have been rejected by the established institutions will apply to IGNOU. But, this is consistent with IGNOU's mission of giving individuals a second chance at higher education. There's an equally keen competition for good jobs in India, a country where a high unemployment rate is one of the continuing problems facing the government. Unfortunately, there are many who want to evaluate the OU solely on the basis of the ability of their graduates to secure desirable employment in a highly competitive market.

While IGNOU is aware of the criticisms and has devoted energy to a public relations effort to inform the public about distance education and the mission of IGNOU, many within the university believe that in time it will be the innovative curriculum and the high quality of the course material which will establish the reputation for the institution. Currently, faculty and administrators are more concerned with institution building, developing new programs, new courses, and new Study Centers.

Major administrative concerns within IGNOU, center on the potential size of the institution. With an expectation of approximately 20,000 new students being added annually for the next three or four years, IGNOU will soon be the largest OU in the world. It has been estimated that IGNOU will serve 700,000 students annually. Production and distribution of materials and the marking of student assignments, already overwhelming activities, have the potential of becoming unwieldy.

In early 1988, IGNOU's Production and Distribution Center was distributing 2000 pieces of mail per day, and this was before the commencement of the Bachelor degree programs which added another 10,000 students to the school's enrollment. The administrative staff is currently exploring alternative methods for both material production and marking (for example, desktop publishing, and computerized response sheets, respectively).

In spite of any potential problems, there's a high level of energy and excitement in the IGNOU offices. Administrators, faculty, and support staff feel they are creating something new and something which has the potential to contribute to the development process and to benefit the nation. As stated by one of the IGNOU administrators, "It's exciting to be a part of this, but we're in uncharted waters, and, frankly, we don't know where it will lead us".

Footnotes

[1] 10+2 is roughly equivalent to completion of high school [grade 12] in the American system
[2] "Ekalavya", Vol. 1,#2. February 1988. IGNOU, Hauz Khas, New Delhi.
[3] Conversation with Ravi Mohan, Public Relations Officer, IGNOU

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Supporting Individual Learners at a Distance

Introduction

Much of the recent literature about higher education, and particularly about higher education for adults, has emphasized the importance of recognizing and supporting the needs of individual learners (e.g, Gamson, 1984; Mortimer, 1984; Astin, 1985; Brookfield, 1986; Boyer, 1987). With almost any group of students, one can no longer make common assumptions about their backgrounds, their preparation for study, their goals for education, or their interests. And yet for effective learning, as Chickering and Gamson note, students "must talk about what they are learning, write about it, relate it to past experiences, apply it to their daily lives" (1987, p. 5). Adult educators, through the development of prior learning assessment as well as experiential learning opportunities, have begun to enable students to become more deeply involved in their own learning, resulting in a more effective as well as more valuable educational experience for the individual student.

Distance learning was originally developed for a student body of mostly adult learners. Certainly this was the notion of the Open University when it set the minimum age for enrollment at twenty-one. And yet most distance learning programs, in order to maintain the quality and consistency of the instruction offered to large numbers of students, developed a highly structured course model in which the student has little input other than the anticipated response.[1] This "industrialized" model has now been critiqued by several distance educators (Holmberg, 1985; Foks, 1987; Moore, 1987), who are now exploring methods and modes of introducing into distance learning greater capacities for individualization. This paper details some of the practices and findings of the Center for Distance Learning of Empire State College, an institution established in 1971 with a premium on individualization, articulated in three key principles:

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[1] For an early critique of this at the Open University, see Farnes, 1975, and Davison, 1975. For a fuller analysis, see Harris, 1987.

1) that effective learning derives from purposes and needs that are important to the individual;
2) that learning occurs in varied ways and places;
3) that styles of learning and of teaching may differ significantly from person to person and from one setting to another.

I.
Identifying Learner Needs

Contrary to the quixotic quest for the ideal core curriculum (Hall, 1982; Lehmann, 1989), Empire State College requires each student to develop an individual degree program which addresses his or her educational needs -- within the context of the individual's background, prior learning, and educational goals, as well as the the larger community's expectations associated with those goals and the institution's broad expectations for that degree. Consequently College faculty, called mentors, have developed detailed procedures and strategies for the educational exploration leading to degree program planning. The Center for Distance Learning has adapted and systematized those procedures and strategies into a distance learning course, appropriately called Educational Planning. Many of the strategies of this course can be extracted and used in the programs of other institutions.

Among the operational assumptions behind the Educational Planning course are that the student's full involvement in the exploratory process is in itself an instructional device which sensitizes the student to the need for learning, thereby providing important motivation. Another assumption is that the more student and mentor uncover and articulate about the student's learning needs, the more effectively can a program and specific instruction be responsive to those needs. There are six stages of the educational planning process:

1. the development of an Educational Autobiography, which describes important aspects of the student's learning background from training, education, and experience;
2. the development of a Learning Inventory of skills and knowledge;
3. establishing personal and professional goals and the consequent educational goals;
4. devising strategies (educational and other) to meet these goals;
5. drafting a degree program implementing these strategies;
6. preparing the final degree program plan and full Rationale Essay.

(Benson and Dehner, 1989)

The two exploratory components, the Educational Autobiography and the Learning Inventory, can be adapted to a number of programs and uses. The Educational Autobiography gives the student an opportunity to reflect seriously not only about the content he/she has learned, but about patterns of learning, preferences and problems, values, habits, the effectiveness of various learning modes and styles, and areas of interest worth further investigation. In active consultation with the mentor, then, the Educational Autobiography becomes for the student a critical tool for identifying educational needs rooted in the context of his/her own life.

The Learning Inventory is a more focused tool to ascertain the level of and raise awareness about critical learning capacities in areas which cut across subject matters and academic disciplines, specifically:

1. Information gathering
2. Critical analysis and evaluation of information, data, evidence and arguments
3. Spoken, written, and listening communications skills
4. Quantitative reasoning and representation of numerical data
5. Observation, review and reflection
6. Recall or memory
7. Management of time
8. Individual knowledge base ("cultural literacy").

As a student works through the process of identifying his or her strengths or weaknesses in each of these areas, he/she is developing a "situation audit" of accomplishments and potential needs. With this inventory in hand, the student and mentor can address the student's program with the same information. Further, in the process of taking stock of his/her own capacities, students frequently recognize the value of additional educational components. Both the Learner Autobiography and the Learning Inventory actively involve each student in identifying learning needs related to his/her own background and interests and to broad educational skills and capacities, thereby laying the groundwork for the articulation of appropriate educational goals and an individual degree program.

II.
Implications for Students' Programs

The degree programs which emerge from this process are comprised of appropriate transcripted or otherwise documented prior learning and studies with the College to address the identified content and learning skills needs. Students in the Center for Distance Learning take those studies through distance learning courses. Like the degree program planning process itself, these courses are designed to be flexibly responsive to students' needs while structured sufficiently to support learning at a distance. This results in distance learning courses which are both less behaviorally programmed than those in the more "industrialized" model and more dependent on the ongoing interaction with the course tutor.

While an objective of early distance learning course design was to create courses which were as self-contained as possible to anticipate student responses, sheer human variability overwhelmed this effort (Foks, 1987). Permitting and encouraging students to actively engage learning in distance courses requires both flexibility within the course design and responsiveness of the course tutor. Depending on the subject matter, courses can be designed with various kinds of flexibility, including skills courses (e.g. composition, quantitative studies), disciplinary content courses, or professional courses (management, human services). Students can be engaged in terms of their own needs, their current knowledge base and interests, or their own situation and circumstances. By designing assignments which can build from and with each student's needs, knowledge, or circumstances, courses encourage students to begin with what is familiar as they engage in their study of the material.

To facilitate this engagement, course tutors must be more than content experts. In the words of the Center's Tutor Handbook,

> [Tutors'] response to [students'] work, and the notion of "dialogue," embody a view of knowledge and of learning which does not attempt to separate knowledge, as some kind of commodity which can be distributed or transferred, from the act of knowing. While books may appear to students to "contain" knowledge, learning implies the reconstitution of such knowledge into their own frames of reference.
> (1988, p. 7)

To prepare for this instructional/facilitative mode, course tutors undergo a two-part orientation process to introduce them to this dialogic approach to distance learning. The Center has also established a set of procedures to support this activity. In addition to the Center's computerized reports throughout the term, Center faculty coordinators continually monitor the narrative exchange between tutor and students. Finally, each term the Center holds a required tutor workshop which focuses on refining tutorial skills. The workshop gives tutors an opportunity not only to compare practices and approaches, but also to discuss specific problems as case studies for group analysis.

Conclusion

The Center's distance learning program has evolved from the student-centered and individualized focus of the rest of the institution. Ironically, College faculty outside of the Center, in comparison to their individual learning contract mode, do not consider the Center's program to be individualized at all. However, recognizing the value and importance of both a supportive, structured format for distance learning and a capacity for individual responsiveness, the Center continues to refine its approach to meet learner needs.

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The Soft Touch in Distant Education: Research in Learner Support

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Electronic media are effective in teaching. Over sixty years of research indicate that no significant differences exist between the learning by students in the conventional classroom and learning by students through radio, television, tutored-videotape instruction, interactive television, computer-aided instruction, computer-based instruction, and interactive videodisc (Gibbins, M.,1989).

In spite of the research supporting the effectiveness of mediated instruction, many academics question the equivalency of the experiences of students in the traditional classroom and the experiences of the students learning at a distance. Distant learning programs are viewed as entities peripheral to the academic center of schools and colleges. They are add-ons, afterthoughts, experiments. Yet the academic and fiscal integrity of these programs requires that they become integral parts of the academic enterprise and that they achieve some sense of permanence.

What must happen for distance education programs to accomplish this? To paraphrase the title of an article in a recent edition of the American Journal of Distance Education (Vol. 3, No. 1, 1989), we must take off our blinders. We must closely examine the learning environments of our students to identify the differences between distant learning settings and more traditional educational settings. Ehrmann (1988) raises some significant concerns about these environments. "Lacking the equivalent of a campus in their distributed learning environments, distant learners have historically been offered a reasonable supply of instructive messages (print; broadcast audio or video) but relatively little in the way of tools and resources (print sources; typewriter; time-delayed conversation; mail) and real-time conversation (optional telephone and several face-to-face meetings a semester). Because their environment is usually deficient in three of the four forms of interaction, distant learners probably suffer barriers to learning, especially in the area of higher order reasoning and open-ended problem-solving, that might be alleviated with more coordinated support." (Ehrmann, 1988)

The purpose of this abstract is to summarize our findings regarding learner support mechanisms, including some mentioned above by Ehrmann. These mechanisms are often examined from a hardware orientation. This focus on technology is understandable; innovations in technology have inspired and supported the growth of distant education in recent years. It is useful, however, to also look at learner support from the perspective of the learners themselves. What person-to-person services should technology deliver to our students? What support do learners need?

Assuming that distant education should at the very least provide benefits equivalent to those of conventional classroom instruction, we believe that learner support mechanisms should:

- provide sufficient interaction between learner and instructor/knowledge source, "sufficient" being determined by the learner;
- provide feedback to the learner on his/her progress and achievement;
- enable scattered learners to communicate with each other if they wish;
- provide access to essential educational materials and resources (course materials, references, library access, etc.);
- minimize the "administrivia" that usually accompanies academic enrollment;
- minimize the perception that learners are isolated from and tangential to the educational process.

Distant Learning Programs at San Diego State University has experimented with various learner support activities in the past five years. One of these programs, PROFNET, uses a one-way video, two-way audio microwave network to deliver graduate courses on live television to professionals at their worksites, primarily high-tech businesses. PROFNET specializes in engineering, computer science and business courses. We bring as many campus services and resources to students at their worksites as is feasible. We register students, distribute course syllabi and make textbooks available for sale at each receiving site. Anecdotal feedback from students indicates that this service is highly valued. Academic advising is televised live, enabling students to speak with their advisors without leaving their worksites.

The educational process has a social quality that some students say they miss in distant education programs. To provide some face-to-face contact during the semester, we ask faculty to visit their students at least once, and we host a faculty-student party before final exams. We once sponsored a PROFNET Night at a SDSU Aztec football game and sent free tickets to all students. Another year, we gathered group photos of each remote class and edited these into a "video yearbook" that was played back during class at the end of the semester. Students are invited to include their names and phone numbers in a PROFNET student directory, enabling them to contact each other outside of class.

On a more practical level, we operate a daily courier service that transports course materials between the SDSU campus and the receiving sites. Students receive a phone directory for essential campus services. When a student misses class and needs a video tape of the missed session, we send him/her a copy. Above all, we invite students to call us when problems arise, and we try to be responsive to their requests and needs.

In 1988, we added a new student population and delivery mode. Accessing the Learning Channel carried by local cable TV companies, we transmitted an state-mandated Teacher Education course, "Mainstreaming," to teachers and education students in their homes. Students registered, purchased course materials and submitted homework by mail. To supplement the interaction provided by the audio bridge linking students' phones to the TV classroom, the instructor held a telephone office hour immediately after class. Many students took advantage of this hour to speak individually with the instructor.

During the Spring and Fall, 1988 and Spring 1989 semesters, we conducted a research study to identify the essential functions of distant education programs. In the first phase of the study, PROFNET students, faculty and support staff were interviewed by a graduate student in Educational Technology. Data gathered from the interviews was incorporated into an extensive questionnaire designed to be applicable to participants of any distant education program using any combination of delivery media. Once refined and validated, this questionnaire will be administered to diverse distant student populations, providing valuable information about the critical elements needed for distant education programs to be successful.

Each item in the questionnaire contains two Likert scales designed to determine both the respondent's degree of agreement to statements about the program, i.e., "The system for testing students is well organized" and the respondent's assessment of the importance of this aspect of the program. The questionnaire was distributed to and collected anonymously from three distinct populations:

- PROFNET students viewing class at their worksites, usually in small groups but often alone;
- SDSU "Mainstreaming" students viewing class alone at home;
- High school students enrolled in Cal Poly Pomona's "PolyNet" program. Similar to PROFNET, college courses in this microwave-based program are transmitted live to students, this time at their high schools.

Of the 90 items in the questionnaire, 19 addressed learner support issues, such as the delivery of homework and tests, the opportunity to get feedback during and outside of class, student peer support, the registration and fee payment process, the instructor's efforts to fit his/her teaching style to the needs of distant students, etc..

In rating the importance of these support factors, the three groups of respondents were usually in remarkable agreement. The six items receiving the highest importance rating (≥2.8 on a 3-point scale) point to four issues on which the respondents frequently agreed:

Availability of a complete syllabus The PolyNet high school students and SDSU teacher education students gave this their highest rating of importance of all the learner support items.

Efficient system for delivering course materials All three groups placed high importance on this component.

Feedback/interaction from instructor during class (2 items) PolyNet and SDSU teacher education students rated this slightly higher than the PROFNET students.

Video tapes of class sessions for review/make-up (2 items) For the adult students--PROFNET and SDSU teacher education students--this capability was highly important.

It is worthwhile to point out here that these elements of distant education systems of greatest importance to students address fundamental, survival-level needs. A good ***syllabus*** gives students a roadmap through the course content and describes the instructor's plan for the semester. This need for a clear roadmap may intensify when students are removed from the instructor, and have fewer opportunities for spontaneous or "off-line" questions about the course administration, content or activities. An ***efficient delivery system*** for course materials is another essential, must-have component. The prompt delivery of homework, tests, supplementary readings and other course materials is critical if students are to keep up with the course and to feel confident in the program's academic integrity. This comes as no surprise to us; PROFNET's previous evaluations and observations have shown repeatedly that students rely on this delivery system as a lifeline to their instructor. When the system delivers graded homework and tests, students receive feedback on their performance. Students indicated that ***interaction with, and feedback from, the instructor*** are of fundamental importance. Finally, students in a dynamic viewing environment--PROFNET students whose work schedule often interferes with the class schedule, and teacher education students at home, where other people and activities may compete for their attention--must have an ***alternate viewing option*** at a later time. For live televised courses, video tapes allow students some flexibility in fitting their studies into their already busy lives. Again, this new data confirms what we already knew from earlier studies.

The main lesson we draw from our research is to allocate our learner support resources where they benefit the students most: on the primary services that meet students' survival needs. Football tickets, group photographs and social gatherings are a welcome reminder that distant education is a people business, but our first responsibility must be to provide the services that enable our students to learn.

AN EVALUATION OF LEARNER SUPPORT SERVICES IN A DISTANCE EDUCATION SYSTEM

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Introduction

The dominant feature of distance education is the separation of the teaching-learning acts resulting from the geographic distance between teacher and learner. In attempting to provide a theoretical basis for the study of distance education, Keegan (1986) proposes that such a theory should evolve from attempts to reintegrate the teaching-learning acts. Because distance students are placed in a unique situation in which neither fellow students nor teachers are physically present to clarify, discuss, or provide feedback, effective distance teaching cannot occur without an effective student support system (Gunawardena 1988). Thus, one important vehicle for analyzing the reintegration of the teaching-learning acts is through an evaluation of the student support system.

Garrison (1987) characterizes the student support system in terms of resources which are available to the learner and resources which relate to the mediation of the communication process. The former apply to both distance and traditional students and include courses, learning materials and teachers or facilitators. The need for the latter result from the geographic distance between teaching and learning acts and thus necessitate some type of mechanical or electrical transfer of information which may include telephone, telecommunications, or mail.

This study analyzes the reintegration of the teaching-learning acts in a distance education system through an evaluation of the student support system from the perspective of the distant learner. It examines the attitudes of the distance students toward the following: a) the resources available to the learner which are directly related to learning including availability of courses, access to learning materials, and the opportunities for interaction among teachers and students; b) the resources available to the learner which are indirectly related to learning including counseling, advisement and job placement services; c) the communication process characterized by the coordination services provided among the sending and receiving sites; d) and the communication process relating to the mechanical and electronic transfer of information. Finally, the study analyzes the reintegration of the teaching-learning acts through a comparison of attitudes of the participating on-campus and distance students to determine if differences exist between these two groups relative to the quality of learning resources.

Background

In 1971, the Oklahoma State Legislature directed the State Regents to establish and maintain a system of televised instruction to make available high quality postsecondary educational opportunities on a statewide basis. Today the Televised Instruction System (TIS) links ten transmitting institutions with over 120 classrooms at 70 locations in 36 communities throughout the state. All programming is transmitted live from regularly scheduled on-campus classes. The signal that originates in the campus studio classroom is routed through the closed-circuit network to the distant site. The network comprises point-to-point microwave radios, remote-controlled radios, and Instructional Television Fixed Service (ITFS) transmitting and receiving systems. The talkback from the remote sites is transmitted to the studio via multiplex equipment that enables the remote student's voice to be transmitted on the microwave radio. Leased telephone lines are also used in some areas of the TIS network to provide talkback capability. Although the system has been operational for eighteen years, the participating students have never been asked to evaluate the service. A Task force charged with the responsibility for making policy recommendations relative to the future operation of the television system, felt that input from the

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students was critical to the development of policy. In response to this concern, the State Regents provided funding to the Oklahoma Research Center for Continuing Professional and Higher Education to direct the evaluation effort.

Methodology

During the Spring 1989 semester, surveys were administered to 453 distance students enrolled in courses on the Televised Instruction System. Of these, 193 were returned, a response rate of 43 percent. Similar surveys were mailed to the participating on-campus students, with 499 surveys returned from the approximately 1200 on-campus students, a response rate of 42 percent.

A panel of individuals representing both the transmitting and distance sites and TIS staff participated in the survey design. The surveys were field tested early in the semester by using both on-campus and distance students enrolled in TIS classes. The surveys included closed-ended questions with ordered choices using a five point Likert scale, with five high, and open ended items.

The analysis of the responses was primarily descriptive, using means, standard deviations and frequency distributions. comparisons of the attitudes between the on-campus and distance students used T-tests and Chi Square. Analysis of the open-ended response items utilized content analysis techniques.

Results

Overall, the distance students gave the Televised Instruction System a high rating, as 88 percent would recommend TIS courses to a friend (with a mean of 4.2 on the five point scale). Likewise, the distance students expressed a very high level of confidence in their course performance (as measured by expected grade), with 65 percent anticipating an A and 30 percent, a B. Nearly two-thirds of the distance students (63.1 percent) did not feel that the on-campus students were at an advantage relative to course performance.

Resources Related to Learning

Access to Courses. One student's comment that the system is the state's best kept secret seems to be largely accurate, as marketing efforts appear to be quite random. Nearly one-half (49 percent) of the participating students learned about TIS through word-of-mouth, compared with 25 percent who found TIS listed in the college class schedule. Only 15 percent saw a TIS bulletin, while one percent learned about TIS from the mass media.

Learning materials. Library resources are very important to distance students as the majority of them (57.3 percent) indicated that success in the course required access to library materials. The effectiveness of the library services provided seemed to be a significant barrier to distance students who are required to use the library. The responses underlined the importance of local library support, as 66 percent of the students reported using either the local public library or the library at the receiving site. In contrast, only 24 percent used interlibrary loan, 13 percent received library materials via the courier service and 12 percent traveled to the library at the sending site.

Many students cited problems with the courier service that is responsible for the delivery of course materials and exams, and only 31 percent of the students stated that they always received materials on time. Textbook services (which are not processed through the courier service) received a mean rating of 3.57, compared to 3.27 for the courier (with five high on a five point scale).

Interaction Opportunities. The distance students were very positive about the concern and helpfulness of the instructor, giving this item a mean response of 3.23 on a four point scale (with four high). Likewise, the distance students are generally satisfied with the interaction opportunities available on the system. The most important form of interaction is the ability to interact with the instructor during class, as eighty percent cited this as important or very important, while 83 percent indicated that they were able to interact with the instructor during class always or most of the time. In contrast, only 47 percent felt that interacting with the instructor outside of class was important or very important, and only 25 percent were able to do so; twenty percent never tried to contact the instructor outside class.

Interactions with other students whether in class or outside of class were considerably less important to the distance students since only one-third rated these interactions as important or very important. As expected, the distance students are able to interact with other students more in class than outside class. Again, 20 percent never tried to contact other students outside class.

When asked which services provided the on-campus student with an advantage, the distance students placed a great deal of importance upon access to the instructor and the library with means of 4.31 and 4.04 respectively, followed by the bookstore (3.85), advisement services (3.81), laboratories (3.79), study groups (3.76), student activities (3.47) and finally job placement services (3.4).

Coordination and technical support. A third component of student support services include the mediation of the communication process and includes the coordination and technical services provided by the participating institutions. When asked to rate the services provided by the receiving site, the distance students seemed most satisfied with the TIS enrollment process (3.95), followed by general helpfulness with the TIS course (3.61), provision of course information (3.59), communication with sending campus (3.56), coordination of course materials (3.5), library services (3.11), and counseling services (3.17).

The State Regents staff have primary responsibility for technical support. The problems reported by the distance students seem to relate to the quality of the equipment and courier service rather than the quality of the staff response to problems. The primary barrier seems to lie with the audio from the remote sites which received a mean rating of 3.13, followed by the courier service (3.27). In contrast the TIS responsiveness to technical problems received a 3.89, followed by the video reception (3.73), talkback capability (3.66), and audio from sending campus (3.61).

Comparisons With On-Campus Students

One measure of reintegration is comparisons between the attitudes of the distance and on-campus students toward the services provided. Regarding student services, very little differences existed between the two groups' assessment of the advisement, admission, enrollment and textbook services. As expected the on-campus students rated the library and counseling services higher (t=.001 and t=.003 respectively).

Although both groups indicated that interaction with the instructor during class was important or very important (80 percent for the distance students and 82 percent for the on-campus students), the distance students actually reported more access to such opportunities than the on-campus students. No differences existed between the groups relative to the importance of interactions with the students during class, although the on-campus students reported such opportunities more than the distance students. Although the distance students reported significantly fewer opportunities for interaction with the instructor and students outside of class (X= >.001 for both interactions), they also indicated these activities were less important.

The two groups reported very little differences when assessing the helpfulness of the instructor, with the on-campus students giving this item a mean rating of 3.36 (on a four point scale) and the distance students, 3.23. When asked about study habits, the figures for both groups are also very similar, with the majority preferring to study alone (over seventy percent) rather than in groups or with an instructor present. Both groups are equally confident with their performance in the TIS course, with the majority anticipating an A. As expected, the distance students are more likely to be graduate students, taking the course for job related purposes and to have been out of school for a longer period of time. Finally, the distance students were more likely to have access to a personal computer, modem, communications software and a video cassette recorder than the on-campus students, with 50 percent of the distance students reporting access to a personal computer, compared to 37 percent of the on-campus students.

Analysis of Distance Students' Open-Ended Responses

These items sought to provide further insight into the distance students attitudes toward the TIS system including their opinions relative to: 1) the services that assisted them most in learning course content; and 2) the significant factors that hindered their performance in the course. The survey also elicited student suggestions on how the following services could be improved; 3) the telecommunications system 4) the classroom environment, 5) the coordination between remote and transmitting institutions and 6) distance student support services. Of the 193 students returning surveys, only 19 students (10 percent) did not respond to the open-ended items, indicating considerable interest in contributing to system improvements.

Services That Assisted in Learning TIS Course Content. Responses to this item were analyzed in terms of the three forms of interactions which take place in a distance teaching system including a) interaction between student and instructor, b) interaction with other students and c) interaction with the content. Other categories analyzed included d) print-based support; e) student support services and f) technical considerations. A total of 104 students responded to this item, with many making multiple responses.

The majority of responses identified instructor related interactions including style, method and print-based support as the primary contributors to course success. Interaction with students were cited less often, and included both interactions during and outside of class, followed by interaction with the content, where students essentially reported that course success was largely due to factors relating to self determination. Finally a few attributed course success to system maintenance and the work of the camera operator.

Factors which hindered performance. Of the 193 surveys which were returned, 138 of the students responded to this question. These responses were analyzed in terms of the following categories: a) interaction between student and instructor; b) interaction between student and content; c) interaction between student and other students; d) unruly behavior; e) student support; f) technical considerations; g) physical facilities, and h) special concerns of the students in prison.

The major factors which hindered student performance were technical difficulties associated with the telecommunications system, especially in relation to poor audio from the transmitting and receiving sites, b) lack of library resources, and c) instructor style or method of instruction. Although a few students cited the lack of interaction opportunities with other students as a inhibiting factor, others cited disturbances created by other students. Other considerations cited included an inadequate courier service, poor coordination at the remote site, lack of color transmission, poor camera operators, and inadequate facilities. Unique problems of the prison population included missing classes due to guard counts, lack of study time and space, no typewriters, and pressure from prison staff.

Suggestions for improving the technical service. Of the 126 students who responded to this item, 28 indicated that they had no suggestions for improving the system. The majority of responses, however, point to a pressing need to improve the audio system so that the students at the receive sites can hear and interact with the transmitting classroom instructor and students. Other comments related to the need to add color transmission, increase access to the talkback phones, and improve production. A few students reported difficulties with the TIS emergency number when reporting technical problems.

Suggestions for improving the classroom environment. Of the 119 students who responded to this item, 27 indicated that they had no suggestions for improving the classroom environment. The most common requests were for more space and more comfortable chairs which fit adults. Other concerns cited related to temperature control and eliminating disruptive behavior.

Suggestions for improving coordination. Responses to this item indicate that 30 of the 97 students responding to this question had no suggestions for improving coordination. The two areas cited most frequently were the delivery of materials (in terms of both speed and reliability) and the need for increased interaction opportunities with the instructor. Several students mentioned the need to improve proctoring services, while others wanted to be notified when classes were cancelled.

Suggestions for improving support services. Responses to this item are discussed within the following categories: a) interaction between student and instructor, b) interaction among students, c) support services, d) remote site coordination, and e) TIS administration. Of the 107 responses to this item, 22 students indicated that they had no suggestions for improving the support services. Many of the comments relating to interaction with the instructor were founded in the perception that the instructors did not understand the unique needs of the distance students. Other comments related to the need for more interaction with the on-campus students, more access to library and laboratory facilities, counseling and tutoring services, and improved textbook services. Suggestions for improving remote site coordination included providing the distance students with an orientation to the TIS system, and improved proctoring and receive site coordination.

Summary

Effective distance teaching cannot occur without effective student support, whether in terms of resources available to the student or in terms of the mediation of the communication process. One important, but often overlooked feature of a support system is simply making the opportunity available. Courses are not available through a system when students do not know the system exists. Because the distance students feel that this is an important service, reintegration of the teaching learning acts through the TIS system can be enhanced by improved marketing efforts designed to inform potential students about the opportunities available through distance education.

For students who participate in the system, the reintegration of the teaching-learning acts is adequate, as measured by confidence in performance, attitude toward instructor, opportunity for interaction, and comparisons with the attitudes of the on-campus students toward the services provided. The major areas for improvement in services directly related to instruction include the availability of library and counseling services. The primary focus of improvements supporting the mediation of the communication process, should include improvement of the audio system, improvement of the delivery of materials, and improvement of coordination at distant sites.

Although the students gave the instructors a high rating, analysis of the open-ended items uncovered a disturbing finding relating to the quality of the instruction. The transmitting institutions should implement a faculty development program for faculty which should provide both training and rewards for TIS faculty. The training efforts should focus not only on the use of the medium of television, but also on the communication process as it relates to the needs of the distance student.

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Narrative Summary

Session title: SUPPORTING DISTANCE LEARNERS: Devices that Work

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Introduction:

In the community college, many students enroll in distance learning delivery systems motivated more by expectations of expediency than by a true understanding of the dynamics, rewards, and challenges of self-directed learning. Experience has shown, therefore, that it is vital for institutions to provide systems and devices which meet the specific support needs of students enrolled in non-traditional systems of instructional delivery. On the other hand, a substantial number of self-directed learners actively resent or resist conspicuous institutional direction and structuring of what should be a self-directed distance learning experience; after all, they chose that delivery mode in order to be rather isolated in their learning and not to have to adjust to procedures that demand their presence at prescribed times and places.

When implementing support services for telelearners, therefore, a vital objective is to find ways to help the students learn how to succeed in a non-traditional system while at the same time encouraging their independence as learners. The College of DuPage offers over 53 courses in a distance learning mode to approximately 2,000 students each quarter. Over the past few years, the College of DuPage has tried out varied and judicious uses of technology along with direct and tangential services for distance learning students to explore their potential to improve retention and student success in these courses. Our purpose in this presentation is to describe four such support systems, recently developed and implemented, in hopes of assisting a diverse student body as they pursue college credit courses through the College's Center for Telelearning.

1. INTER-ACTIVE, COMPUTER-DELIVERED ORIENTATION TO TELELEARNING

Frequently, new telelearning students had informed us that they really did not understand at the outset what would be demanded of them in a telelearning course, particularly in terms of a telelearning student's personal responsibility for defining, organizing, and pacing a learning experience in such a course.

Over the past year, in cooperation with the College of DuPage's Office of Instructional Design, telelearning faculty developed an interactive computer program which provides a low-key but information-intensive instructional and self-assessment module whereby students assess both their readiness for distance learning, (personality and learning style characteristics which impact academic success in distance learning courses) and learn some general approaches to succeeding in telecourses. The interactive module's purpose is to guide students to understand the differences between distance learning and traditional learning, particularly as those differences relate to students' responsibility. Since this computer program is best understood when seen on a computer screen, we will present it on a computer-display set-up during our panel.

2. GROUP-VIEWED, GROUP-PACED, COACHED TELECOURSES

Long experience with several telecourses considered exceptionally difficult and/or with significantly low completion rates -- and students' responses on evaluation instruments of those and other telecourses -- suggested that a great number of new or previously unsuccessful telelearning students did not feel prepared or sufficiently confident to undertake self-directed study, particularly when it involved learning complex materials in the total absence of a supportive learning community, physically present instructor, or externally imposed learning schedule. To address this issue, the College of DuPage field-tested and then began to regularly schedule a delivery system for Humanities 101 which combines aspects of telecourses and classroom-delivered courses. In the group-viewed, group-paced sections of Humanities 101, audio and video segments are viewed or heard in group sessions. The faculty member functions as a coach in these sessions and as an evaluator of student work, and she/he places particular emphasis on pre-viewing suggestions which structure students' encounters with media-delivered content. Although traditional lecture or discussion on course content is not scheduled during these sessions, students are assisted in attending to the video and audio components purposively. In addition to creating a group climate for viewing media materials, this delivery system also differs from traditional telelearning because the course is instructor-paced, not student-paced. Students not only view materials as an assembled group; they also test and submit papers on a group schedule.

This group-paced, group-viewing option has been successful in increasing retention for distant learners in this particular course. More important, participation in this "half-and-half" course has allowed students to develop telelearning skills which foster more successful experiences in future, more independently undertaken telecourses.

3. CASSETTE CHECK-OUT

Although virtually all of College of DuPage's 2000+ distance learning students are within driving distance of our central campus, most strongly prefer not to be required to travel to campus do their viewing of video tape cassettes. In order to support these students more effectively, a decision was made to make all video and audio tapes available for viewing or listening at neighborhood learning centers. However, increased demands from students pushed the College to offer students even more convenience -- the chance to check out cassettes for home viewing and listening at times convenient to students. At present, telecourse tapes are circulated from both the audio-visual division of the Learning Resources Center located on the central campus and from four satellite locations in community learning centers. Providing this service has required the implementation of tape duplication and check-out systems which will be briefly discussed in the panel. The increasingly large numbers of students who avail themselves of this service, who clearly prefer tape checkout to either on-site or television or radio broadcast, has caused the College to commit increased resources to tape checkout. A description of the development and growth of the checkout program and numerical data summarizing checkout statistics will be briefly surveyed in the presentation.

4. VOICE MAIL

When we have tracked students who have been unsuccessful in telelearning attempts and have either failed or withdrawn from courses, we have discovered that the single greatest problem they cite is an inability to be in touch with their instructor quickly and at times crucial to their continuing in the courses chosen. Because our system of delivery is largely dependent on part-time instructors who often are on campus only once a week, we sought a way to increase accessibility of teachers to students. The result has been the piloting of a voice-mail system to offer students the opportunity to proffer questions and problems to instructors and to receive rapid response as needs arise. Students are given voice-mail box numbers of their instructors and are assigned personal voice-mail boxes. Instructors are committed to checking their voice-mail box from any touch-tone phone anywhere in the world at appropriate intervals. A student who asks a question or needs help calls in his request to the instructor's voice-mail box. Within twenty-four hours on average, the instructor responds to any accumulated messages, and the student understands that approximately thirty-six hours following the question, there will be a response for him in the system. This accessibility results in a reduction of the sense of isolation that distance learners often experience, and, furthermore, students learn that the teacher is an important resource in their learning, but that as distance learners, they must devise the most appropriate means of using that resource for their self-development.

The rapidity of response cancels the frustration inherent in having to wait for contact with an instructor for a limited number of hours of availability in the week. While the system asks only a phone call from the instructor at regular intervals, it presents a twenty-four hour availability for students to present their learning difficulties at times when they are freshest in their minds. The importance is that learning does not get bogged down when a hurdle cannot be overcome because of inaccessibility of instructors. Usually, the instructor can reply instantly to the student's questions and the student can garner those answers with a second phone call. If, however, there is more complexity to the issue than can be resolved in a recorded response, the teacher can ask the student to call at a specified time and number and interactive conversation can be pursued outside of the times when the instructor is physically present in the center for telelearning.

Title: Assessing Adult Learning Strategies
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Introduction

Learning strategies are the techniques or skills that an individual elects to use in order to accomplish a learning task. They differ significantly from what traditionally have been labeled as study skills. Mayer (1988) commented on this difference saying "there is a long and somewhat disappointing history concerning teaching of these skills. What is new with the current interest in learning strategies is that it can be based on an emerging cognitive theory of human learning and memory" (p. 21).

Current interest in learning strategies indeed has increased. Cognitive psychologists have found that instruction in the use of effective strategies does improved student achievement scores (Dansereau, 1985; McCombs, 1988; Weinstein & Mayer, 1985; Wittrock, 1985). Courses directed to the improvement of learning skills have tended to move from the teaching of time-honored, recommended practices in note taking, time management, and similar study skills to attempts to educate students in cognitive psychology and to develop personal metacognitive and memory strategies.

At the same time the concept of "learning how to learn" has been given more attention by the field of education and by adult education in particular. The publication of Smith's (1982) award winning book on the topic stimulated the interest of many who were convinced the updating of learning skills was an effective way of enhancing adult learning. Two concurrent interests, awareness of the self-directed nature of much adult learning (Tough, 1971) and growing insight into individual differences in learning styles (Conti & Fellenz, 1988), promoted even more interest in helping adults learn how to learn.

In 1988 the research staff of the Kellogg Center for Adult Learning Research at Montana State University initiated a research project designed to examine adult learning strategies and investigate their potential for improving the effectiveness of learning activities. The group began by establishing a conceptual framework based on the literature in both cognitive psychology and adult education. A device for the assessment of the strategies actually being used by adults was deemed essential before an curriculum to teach such strategies could be designed. This conceptual framework and assessment device are the subject of the remainder of this paper.

Concepts Essential to Adult Learning Strategies

Five aspects of the learning process were selected as essential to the learning process and as having potential for improvement through the refinement of learning strategies. They were: metacognition, metamotivation, memory, resource management, and critical thinking skills.

Metacognition refers to our knowledge and understand of our own cognitive processes. It has often been defined as thinking about the process of thinking. Yussen (1985) credits John Flavell's 1971 publication with stimulating the interest of cognitive psychologists in metacognitive strategies of children. However, he suggests that adult cognitive development may be an even more fertile field for investigation. Whereas children are developing cognitive skills, "adulthood seems to be a period in which a large arsenal of symbolic ability and learned skills are already available and many changes take place in how adults apply these skills and ability" (Yussen, 1985, p. 271). Metacognitive strategies include the designing of learning projects according to one's learning style and the nature of the task. They are concerned with the planning, monitoring, and regulating of our learning activities.

Metamotivation is a nebulous concept concerned with our awareness of those elements that energize and direct our learning behaviors. McCombs (1988) provided a cognitive basis for a training program in motivational learning strategies while Wlodkowski (1986) struggled with factors impacting motivation is the self-directed adult learner. Certainly, we can include among metamotivational learning strategies those that affect our desire to learn, our attention to learning tasks, and our expectancy of success.

Memory skills have received more attention than any other aspect of cognition. The problem is that most research has been based on meaningless tasks such as the pairing of nonsense syllables. Reactions by educators to such irrelevant memorizing have been so strong than any mention of the use of mnemonic devices to improve learning is often met with disgust. However, there is increasing evidence that chunking, level of processing, and other rehearsal strategies can improve the storage process. Similarly, searching techniques and external aids are useful resources in the recall process while ordering and imaging provide a whole series of valuable cognitive tools.

Resource management strategies include generalized skills such as managing time and selecting environments in a manner conducive to learning. However, they also concerned with habits adults may have developed throughout their lifetimes. Shirk (1983), for example, discovered that many adults selected learning resources according to their availability rather than their usefulness. It is also evident that many adults hesitate to use modern sources of information because they do not understand the technology that makes them available. At the same time "imaging" through mass media is being credited with swaying public opinion and consumer practices. Strategies for the identification of the most appropriate resources, critical evaluation and use of such resources, and arranging time and environments for learning can make learning more effective.

Critical thinking another aspect of the learning process that is recognized as essential but difficult to define. Brookfield (1988) and Meyers (1987) are but two of the many who recently have tried to explicate the skills and processes involved in such thinking. The definition used in this project is that critical thinking is a parallel process by which individuals analyze given information in a contextually specific situation and create new ideas, concepts, or constructs based on their analysis. Strategies likely to improve critical thinking in adults seem to fall into four categories; i.e., recognizing and testing assumptions, assessing contextual parameters, generating and testing alternatives, and conditional acceptance of concepts and conclusions.

Assessment of Learning Strategies

Currently there are at least two instruments available for the assessment of learning strategies. Claire Weinstein (1988) of the University of Texas designed a Learning and Study Strategies Instrument (LASSI). It includes the following ten scales: Anxiety, Attitude, Concentration, Information Processing, Motivation, Scheduling, Selecting Main Ideas, Self Testing, Study Aids, and Test Strategies. Weinstein has used her instrument in concord with a learning strategies course she teachers to undergraduates but believes many of the same concepts apply to adult learners. Paul Pintrich, Wilbert McKeachie, and associates (1988) at the University of Michigan have also developed an instrument they used with graduate and undergraduate students. The Motivated Strategies for Learning Questionnaire (MSLQ) contains motivation, cognitive, and resource management scales. The cognitive scale is composed of rehearsal, selection, organization, and elaboration strategies, as well as metacognition, surface processing, critical thinking, and original thinking components.

Debates over the transferability of learning skills designed for academic environments to real-world situations moved the Kellogg Center staff to use adult "real-life" learning situations as the context for learning strategy assessment. A series of scenarios that necessitate various types and levels of learning have been devised. Questions assessing how likely an individual is to use specific strategies to deal with the learning problem are currently being tested. Drafts of the instrument will be available through the Kellogg Center for Adult Learning Research at Montana State University.

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GOAL ACCOMPLISHMENT STYLE AND THE LONG DISTANCE LEARNER

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Proposition: Student success in distance education programs is related to specific characteristics often associated with the will, e.g., initiative, persistence, perseverance, and determination. If distance educators are to improve the success/failure ratio in the programs they offer, they must take into account these important characteristics.

The concept of the will is useful if one wants to raise questions concerning success and failure in distance education programs. The field of distance education is tailor-made for the student who can complete what he/she starts - particularly within a specified timeframe. Many students, however, register for courses and drop out. It is possible that, although they have the cognitive capacity to do the course work, they lack specific skills related to personal productivity, i.e., persistence and determination. In this paper, two theoretical perspectives related to personal productivity will be examined and implications for distance education will be explored.

The Will and Personal Productivity

The perspective of the will to be considered in this paper is that of Assagioli (1971, 1974). In commenting that the Victorian concept of the will still exists to some extent, i.e., that the will is stern and forbidding, Assagioli goes on to observe that

> The true function of the will is not to act against the personality drives to *force* the accomplishment of one's purposes. The will has a *directive* and *regulatory* function; it balances and constructively utilizes all the other activities and energies of the human being without repressing any of them. (1973, p. 10)

In other words, the will acts as the director of the personality. For example, when a person says, "I will have it done on Thursday" (and does it), he/she is exhibiting a strong will. Assagioli has identified four aspects of the will, two of which are considered here. He has proposed that the will can be:

1) strong, i.e., the will can have enough strength to be sure that "a willed act will contain enought intensity, enough 'fire,' to carry out its purpose." (1973, p. 35); and

2) skillful, i.e., the will has "the ability to develop that strategy which is most effective and which entails the greatest economy of effort. . . and to "direct all the other functions and forces of our being so that they may lead us to our predetermined goal" (1973, p. 47).

It would appear that the ability to be purposeful and goal directed (aspects of a strong and skillful will) fits well with the student requirements found in distance education programs. In addition, Assagioli has identified "qualities of the will . . . (or) characteristics displayed by willers" that speak to the needs of long distance learners. When the will-in-action is examined, specific characteristics can be observed, e.g.: determination, persistence, initiative, courage, and organization (1974, p. 19). Personal characteristics such as these and others that describe individuals of strong character are underlying characteristics of goal-oriented behavior. The range of characteristics that an individual possesses makes up the structure of his/her character (Atman, 1989).

What must a distance education student do in the pursuit of course work? He/she must develop a plan that includes study time, assignment completion, and examination preparation. Throughout the planning process, the student is faced with decisions. He/she has set a goal (represented by the course) but now he/she must identify alternative ways to approach the goal, analyze and rank alternatives, judge the highest-ranked alternatives and choose the 'best' one (Beyer, 1987, 27). Along the way, strong characteristics of character pave the way for steady progress through course requirements.

Not only are decisions needed related to the progress of the course. To be successful, students must monitor their own behavior as they move through the plan that they have established. The process of monitoring one's own behavior is called metacognition (Flavell, 1976).

> Metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them . . . and to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects of data on which they bear, usually in the service of some concrete goal or objective. (p. 232)

In the distance education context, the skills students need include 1) the ability to set learning goals and 2) the willingness to monitor their own progress toward the goals. Students who have not taken an active hand (exercised a strong, metacognitive will) in their own self-directed learning processes may find it difficult to meet time deadlines established throughout the program by instructors.

Goal Accomplishment Style and Personal Productivity

When an individual behaves consistently in an area of endeavor over a long period of time, we say that he/she has a certain "style." The concept can be applied to goal-directed behavior, in which case "goal accomplishment style" describes the series of behaviors related to the goal accomplishment process. A theoretical model of goal accomplishment has been proposed (Atman, 1987) and can be seen in Figure 1.

THE CONATION CYCLE

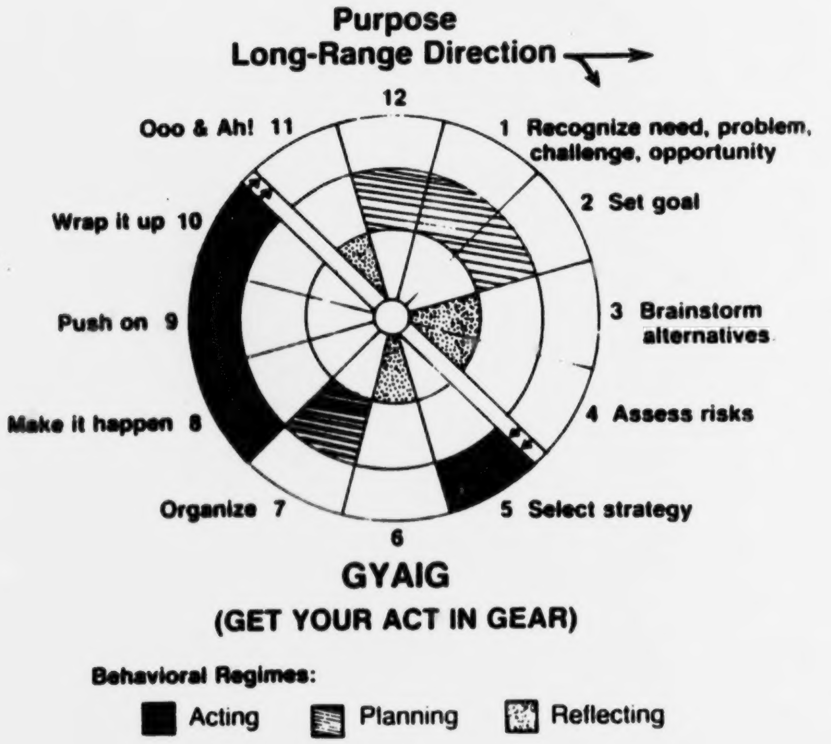
Purpose
Long-Range Direction
12
1 Recognize need, problem, challenge, opportunity
2 Set goal
3 Brainstorm alternatives
4 Assess risks
5 Select strategy
6
Organize 7
Make it happen 8
Push on 9
Wrap it up 10
Ooo & Ah! 11
GYAIG
(GET YOUR ACT IN GEAR)
Behavioral Regimes:
■ Acting
▤ Planning
▨ Reflecting

Figure 1.

The Conation Cycle is based on an entrepreneurial case study and is depicted as a mnemonic visual. The Cycle is composed of twelve easily identified steps related to the goal setting/accomplishment process. (Step 6, GET YOUR ACT IN GEAR, involves visualizing and Step 11, Ooo & Ah!, involves both evaluation and treating oneself for a job well done.) Examination of individual and group productivity can be accomplished by reviewing demonstrated behaviors along the twelve-step continuum.

An individual's goal accomplishment style can be measured through use of the Goal Orientation Index, a 96 item self-report inventory based on the Conation Cycle. GOI data is useful for bringing to a level of awareness an individual's ability to function in the goal achievement process. Often, individuals begin projects without considering alternative routes or assessing the risks associated with a proposed plan. Many individuals set goals but do not complete them - things "fall through the cracks." Some individuals are natural planners while others resist even well intended structure imposed by others (Atman, 1988).

Implications for Distance Education

What implications for distance education can be drawn from a consideration of the relationships among an individual's will, characteristics of character, and goal accomplishment style? The conative domain provides a useful framework with which to examine the relationship. To do this, the following conative objectives are proposed:

Throughout this course, the student will:

1. Demonstrate skills associated with striving:
   a. information processing
   b. energy mobilization
   c. time-use control
   d. stress management.
2. Develop characteristics of character appropriate for success in his/her distance education setting.
3. Exhibit a goal accomplishment style that will lead to successful course completion.

Long distance learners have at least two advantages over their more traditional counterparts: 1) they have built-in flextime and 2) the new telecommuniction technology can put them in contact with an expanded information base which can assist them as they pursue course work. To promote student academic success, distance education course designers must seek new and innovative ways to provide a strong support network for students. The following curriculum-embedded strategies are proposed to strengthen distance education programs:

1. List conative objectives for each course.
2. Provide an introductory unit that identifies and teaches conative skills.
3. Establish early contact between instructor and student.
4. Provide student with goal accomplishment style feedback.

When distance educators take into account specific individual characteristics in their design of distance education programs, two important results will occur. First, the designers will facilitate the personal/professional development of the students they teach and, second, they will increase the likelihood that those same students will complete the courses for which they have registered. Impossible goals? Not at all! We, however, must exemplify qualities such as determination, persistence, and courage if we are to provide programs of the highest quality and vision for long distance learners. The conative domain provides the framework. It is up to us to use it.

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Session Title: Strategic Education: Distance Learning for Business Needs.

Topic: The learning process; the essential nature of the dialogue.

Presenters: Constance M. Beutel, Ed.D and, Mae Jean Go Ph.D.
Telesis Management Institute
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PURPOSE:

This presentation is designed to review and to challenge the application of existing technology in the provision of full motion video distance education so as to consider the possibility for creative and meaningful dialogues between instructors and students.

INTRODUCTION

Traditional corporate structures based on the schema of Scientific Management, or Taylorism, are evolving in new ways. The old Bell System marked the hallmark of scientific management and behaviorism (re: The Hawthorne experiments). Today commentators, notably Peter Huber of MIT, describe the telecommunications industry as the "geodesic network" representing the multi-nodal reality of communications at the end of this century, i.e., no longer dependent on the hierarchy of switched systems.

Pacific Bell as one of the seven Regional Bell Operating Companies is the second largest employer in the state of California. It has moved rapidly to modernize its plant and its technology to meet the sophisticated telecommunications needs of California. A Pacific Bell District manager, reflecting on the swift application of new technology in the corporation, said, "It is like going from fossil fuels to atomic energy in one step."

This rapid employment of new technology while adjusting to market driven competition has meant that advanced solutions to upgrading and maintaining technical proficiency among employees has been an essential component of the corporation's business plan. Traditional ways of acquiring knowledge through hiring strategies and training programs are inadequate in an era where technical obsolescence of the existing professional staff can easily occur within five years or less of graduation. James Naisbitt writing in *Re-inventing the Corporation* , describes the decreasing shelf-life of products because of the effect of shorter innovation (new product development) and marketing cycles.

To address the needs of providing cogent and timely education to employees of Pacific Bell, a technical education distance education network was installed in 1987. This network consists of the following subscriptions: National Technological University (a consortium of 28 universities throughout the United States), Stanford Instructional Television Network, and Chico State University.

THE DIALOGIC ASPECT OF EDUCATION

In the traditional educational setting, the pedagogy practiced often duplicates a model designed to provide competent workers and professionals for the old Industrial model, or what Alvin Toffler calls the Second Wave. Teachers/Instructors lecture and students passively listen and take notes. Learning is noted in the testing process. At the graduate level, universities tend to utilize seminar formats with smaller class size and more opportunities for students to interact with the instructor and among themselves. This dialogical give-and-take is frequently absent over distance education networks. Students and instructors are isolated from one another. Paulo Freire describes true education not as an "I think" but as a "We think." It includes the potential for growth between the students and their teachers. Ira Shor writes that "Dialogue seals the act of knowing."

We feel that an extraordinary resource of experience, questions, and problematizing of real concerns and business challenges is lost in the current distance education structure because of the difficulties to engage in dialogue. We suggest that by using existing technology, new ways of encouraging the dialogue are possible.

DESCRIPTION OF EXISTING EDUCATIONAL NETWORK AT PACIFIC BELL

Employees at Pacific Bell can attend distance education classes at one of five California work location sites: Sacramento, San Ramon, San Diego, Pasadena, or Tustin. Conference rooms equipped with television monitors, VHS recorders, and telephones are available. A "TV Guide" is published each term describing the technical arrangements, logistics, and backup taping procedures.

Few students attempt real-time questions over the network. They describe frustrations with delays in being connected, the annoying differential between land and space signals (i.e., the necessity to turn the TV set down when asking questions), and the frequent surprise of instructors who are startled to hear a question waft in from "TV land."

This track record of student frustration in asking questions, and the virtual impossibility of being able to dialogue meaningfully with either the instructors or with distant co-students is strongly felt to have a significantly limiting effect on the educational experience. Potential students are discouraged to attend a class alone and tend to think of televised courses as tedious.

PROPOSAL

The specific application of existing telecommunications technology that was investigated for this presentation and that would enhance the possibility of dialogue and interaction was voice mail.

A collaborative dialogue was held with Marty Parker, President of Genesis Electronics Corporation, and Elizabeth Williamson Parker, educator, writer, and telecommunications consultant. Genesis Electronics Corporation provides voice mail solutions to small-and medium-size companies and departments.

The following areas were addressed in the application of voice mail:

- Asking questions:
  - Instructors could prepare questions in advance and have students reply over a voice mail system that would identify the caller.
  - Students could ask questions at anytime that could be reviewed/screened and replied to either during the class or via voice mail response
- Acknowledgement of who is in the "electronic classroom:"

Students could register their presence by a simple dial-up procedure. A pre-recorded voice announcement could identify who and where they were as the "roll" is taken around the country. The idea is not essentially a roll taking exercise, but rather as a vehicle to build connections among the class and the instructor.

- Tests/Quizzes:

  Students could take quizzes in real or non-simultaneous time using voice mail. The instructors could have nearly immediate response back.

- Bulletin Board:
  - Instructors who receive numerous questions, or have information that is pertinent to communicate between class sessions, could establish a mailbox number and leave reflections and messages for students.
  - Students could use the system to connect to one another.

- Voice record of questions/dialogue between the student and the instructor.

  Students who use this as one medium to interact with the instructor, could record their questions and responses as a means of review and reflection on their progress in the class.

CONSIDERATIONS:

While the voice mail application has yet to be formalized within Distance Education, it represents an application of technology that exists today and is easily accessible. As computers, fax machines, telephones, interactive video and voice mail continue to move towards full integration, or as Stewart Brand refers to the "plasticity" of digitization, education both in the classroom at hand and the one elsewhere on the planet should engage in exploring and providing as many channels for dialogue and interaction as possible. Knowledge that is re-invented with each student and has the dialogic forum to experience the reality of "we think" should make a substantial contribution to education.

Strategic Education: distance learning for business needs
Topic: The learning process and the essential nature of dialogue

Constance M. Beutel, Ed.D. and Mae Jean Go, Ph.D. Pacific Bell

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Application of Instructional Television
in the
Farm Training Program
at
Northcentral Technical College

Vern Doenier

Introduction

In 1988 Northcentral Technical College (NTC) received Kellogg Foundation and Title III funds which enabled the college to offer district educational programming through distance delivery using interactive instructional television (ITV). NTC is located in central Wisconsin. The main campus is at Wausau with branch campuses at Medford, Antigo, and Phillips. Classes are offered at various communities throughout all or parts of its ten-county district. NTC is one of 16 technical college districts in Wisconsin, providing education through associate degree, certificate, diploma, related apprenticeship training, customized training, and other courses with degree requirements being less than that for the baccalaureate degree.

The Farm Training Program (FTP) at NTC is an adult education program for farmers actively engaged in farming. The course is offered by an instructor to 65 to 70 students at three class centers in a certain geographical area of a technical college district. The program of instruction consists of 30 hours of classroom, which usually are offered evenings; 15 hours of seminars and tours; and 12 hours of individual on-farm instruction.

Northcentral's ITV system is a combination of point-to-point microwave channels to and from each of its four campuses and two omni-directional ITFS channels that can be received at three of NTC campuses as well as at twelve high school sites. Telephone lines are used for the audio return for the ITFS channels. The FTP classes used an ITFS channel to deliver instruction at the Athens High School and a Darome teleconvener with push-to-talk microphones for the audio return.

Field Research Project

This field study involved applied research using ITV in adult education classes at a technical college level. The study partially fulfills completing the requirements for the author's Ed.D. in Vocational Education at the University of Minnesota.

A review of current literature in distance education indicated a need for research using ITV in adult education. Specific application of ITV was in the FTP classes at NTC. Students' acceptance and farm management ability levels were measured to determine the effective uses of ITV and videotape as compared to the traditional method of instruction. In addition, a cost-effectiveness study was completed comparing ITV, videotape, and traditional instructional delivery methods. Distance delivery using ITV was one of NTC's top priorities as stated in its Strategic Plan for 1986-1990.

A basic difference in this study's population was that the distance class was a sizable group consisting of eighteen students. Normally a distance class would be much smaller, usually having not more than ten students.

This field research was a static-group comparison study. The instructor's three FTP class centers served as the intact groups for the field research. The Wausau class center was the origination site. A second center, Athens, served as the distance receiving site. Marathon, the third center, remained as a traditional instruction class center. In addition to these three groups, a fourth group of students received the sessions on videotape.

Classes were conducted during NTC's 1988-89 school year starting the first week in October 1988 and ending the last week of January 1989. A total of ten classes were offered of which eight sessions were taught in the classroom using ITV. Two sessions for each of three class sites included meeting as a class at specified students' farms. One of each of these farm meetings was videotaped.

Evaluation instruments were developed to measure students' farm management abilities and acceptance levels for the ITV and videotape methods as compared to the traditional instructional method. Data was collected during the months of February through May 1989.

Data analysis included students' farm management abilities and acceptance levels of ITV, videotape, and traditional methods of classroom instructional delivery methods. A cost-effectiveness comparison was made between the three methods of instructional delivery.

Preliminary Findings

At the time of writing this, a statistical analysis of the study was not completed so comments will be limited to observations of the ITV experience. Class attendance did not vary for the three centers so the researcher would conclude students' acceptance of ITV was favorable. Student participation in viewing the videotapes was similar to class attendance participation. The researcher again concluded students' acceptance of the videotape class was favorable. Videotape students commented that they would not have participated in the FTP if it were not for this alternative as it gave them the flexibility to watch videotapes when their schedules permitted. It would be the writer's conclusion that an additional student population was served by the videotapes that ordinarily would not have participated in the FTP. Obviously, taping of the live FTP classes made this alternative possible.

A concern expressed by the distance class at Athens was that the students appreciated the instructor being at their class center. Because ITV was used for eight of the class sessions, students missed having the instructor at their class center.

Technical concerns primarily centered around audio transmission. Students sometimes had difficulty in hearing each other between centers. Students also needed to be reminded to use the push-to-talk microphones. A few students commented that when videotapes were used in class, they were not real clear on the monitors.

When asked about their intent to enroll for the next school year, a high percentage of the students intended to reenroll.

The instructor appreciated the fact that he had fewer evenings to teach and less traveling to his Athens class center.

ITV added a variation in the FTP instructional offering. Students were able to experience an additional alternative in receiving their classroom instruction.

Summary

The ITV experience in the FTP at NTC was a favorable one. The researcher was able to overcome some technical concerns and students were generally receptive to ITV as a medium for instruction.

Because of the concern that students expressed about having the instructor at their class site, students were asked if they would accept having five sessions using ITV for the 1989-90 school year. Students were very agreeable to this so, for the 1989-90 school year, the author intends to teach three class centers at once for five of the ten sessions. The instructor will tape all classes so the videotaped alternative can again be offered to those students requesting it.

Looking to the future, an additional possibility might be that of students receiving ITV class live in the comfort of their home.

Distance Education Through Interactive Television: Is It Effective?

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Providing training in rural/remote areas to preservice and inservice education personnel can be extremely challenging. Weather, travel time, per diem, and other related constraints pose significant problems for educators who are interested in preparing educational personnel to effectively teach and serve students with handicaps. However, the development and utilization of advanced telecommunications technologies has altered the ways in which learning experiences and courses can be provided for distance learners.

A variety of telecommunications technologies are now available for distance educators. The delivery of university course work to rural/remote learners is far less challenging particularly with the development of two-way interactive television systems and other telecommunications technologies. However, very few studies have specifically addressed the effectiveness of various forms of interactive, instructional television in delivering specialized course work to rural/remote college students (Whittingham, 1987).

For the past four years, the Department of Special Education at the University of Utah has been transmitting and taping for distribution a variety of teacher certification courses for distance learners. These courses have been delivered to both post-bachelor's and graduate students in a variety of rural and remote locations in the State of Utah. Several television delivery systems have been used to provide course work to distance learners (see Table 1).

Presented in this paper is a preliminary analysis of five television delivery systems. The last of the five television delivery systems was a system that provided live, "face to face" instruction to on-campus students in a television studio classroom. This system also served as a point of reference or a gauge against which to measure the effectiveness of the other four television delivery systems.

Data for the study were drawn from one evaluation instrument, a media evaluation. On-campus and distance learners responded to the media evaluation items during the last two weeks of each course. Each course was taught by the same instructor. All of the participating students were prospective teachers or educators who were completing a new or an additional special education endorsement. This was also true of the distance learners as well. The number of subjects who participated in each delivery system is found in Table 2.

Method and Data Analysis

The study was designed to evaluate the effectiveness of various instructional delivery systems that make use of television. The evaluation addressed questions dealing with the comparability of the telecourses to conventional on-campus courses, the amount of material covered during the duration of the courses, the relative difficulty of the courses, the overall organization of the courses, the relationship of course objectives to actual course content, the quality of the presenters's delivery, the integration of course assignments with the text readings, the helpfulness of slides and other visual media, the percentage of course material included on tests and the degree to which the courses held the students' interests. A five point Likert scale was used to rate each question. Anchor words for each of the questions varied. For example, the first question on the media evaluation asked learners to respond to the following query: "How would you rate this telecourse compared to a conventional course?" The Likert anchor words for this question are respectively "Inferior," "The Same" and "Superior."

An analysis of variance was used to compare each of the five television delivery systems. Data generated from each of the evaluation questions were subjected to this analysis. Once the analysis for each question was completed, the Duncan's Multiple Range Test was applied to all means that produced significant F values ($p > .01$).

Table 1. Various Types of Television Delivery Systems

TYPES	BRIEF DESCRIPTION
1. Complete, Two-way Interactive Television with an On-Campus Class	The instructor as well as the students see and hear each other continuously.
2. Complete, Two-way Interactive Television with no On-Campus Class	The instructor as well as the students see each other, but there is no studio class is front of the instructor.
3. Partial, Two-way Interactive Television with an On-Campus Class	The instructor is seen continuously by all students, however the instructor is able to see only one of the rural classroom sites during each of the instructional sessions.
4. Taped Interactive Television Course that was taught without an On Campus Class in Front of the Instructor	The students are taught with a tape of an interactive course in which the instructor related exclusively to distance learners in rural/remote sites. No instruction was devoted to students in the television studio classroom. The instructor related to distance learners through two television cameras in the studio. No on-campus students were present in the television studio classroom.
5. Live Interactive Class "Face to Face" in a Television Studio Classroom	The students in this delivery system received their instruction "face to face" in a television studio classroom.

Table 2. Number of Subjects in each of the Various Television Delivery Systems

TYPES	NUMBER OF SUBJECTS
1. Complete, Two-way Interactive Television with an On-Campus Class	21
2. Complete, Two-way Interactive Television with no On-Campus Class	26
3. Partial, Two-way Interactive Television with an On-Campus Class	22
4. Taped Interactive Television Course that was taught without an On Campus Class in Front of the Instructor	4
5. Live Interactive Class "Face to Face" in a Television Studio Classroom	57

The study is a preliminary study because of the small subject pool for the Type 4 instructional delivery system. It consisted of only five distance learners; however, new data is now being collected which will bolster substantially the size of this sample.

Results

Five television delivery systems (see Table 1) were analyzed using 13 questions drawn from a media evaluation. Of the 13 questions analyzed, six produced significant F values (p >.01). Each of the questions that produced significant F values will be briefly reviewed.

Comparability to a conventional course. Analysis of the question dealing with the comparability of the telecourse to a conventional course produced a significant F value (p >.01). The Duncan's Multiple Range Test revealed significant differences between the Type 2 (taped interactive course) and the Type 5 ("face to face") instructional delivery systems. The means for these systems were respectively 3.50 and 3.33.

Amount of material covered. Significant differences were found on the question that addressed the amount of material covered in the telecourse. The differences were found between the following pairs of means: Type 1 (complete, interactive television) and Type 5 ("face to face" instruction), Type 1 and Type 2 (taped interactive television), Type 1 and Type 3 (partial interactivity), Type 4 (taped interactive course) and Type 5 ("face to face" instruction), and Type 4 and Type 3 (partial interactivity).

Difficulty of the course. Means regarding the level of difficulty of the telecourses generated a significant F value (p >.01). Differences in paired means occurred between the Type 4 (taped interactive with no on campus class) and Type 3 (partial interactive) systems, and the Type 4 and Type 5 ("face to face" instruction) systems.

Clarity of the course content. Ratings regarding the clarity of course content were also found to be significant. The Duncan's test revealed significant differences between the Type 4 (taped video with no on-campus class) and Type 3 (partial, two-way interactive television) delivery systems. The respective means for each delivery system were 4.25 and 3.09.

Course objectives. A significant F value was produced for the question which dealt with the degree to which the course objectives were addressed in the weekly, instructional programs. Using the Duncan's test, significant differences were found between the Type 4 (tape of an interactive class with no on-campus students) and Type 3 (partial interactivity) instructional delivery systems. The means for these delivery systems were respectively 4.20 and 3.27.

Integration of the text with class sessions. The F value for question eight was also significant. It assessed the degree to which the text and weekly assignments were integrated into each week's class activities. The Duncan's test revealed significant differences between the Type 4 (a video tape of an interactive class with no on-campus students) and Type 1 (interactive television with no on-campus students) systems, and the Type 4 and Type 3 (partial interactivity) systems.

Other evaluation factors. No significant differences were found among the instructional delivery systems in the organization of the courses, the presenters's delivery in each of the courses, the visual materials used, the capacity of the courses to hold students' interests, and the attitude of students toward the courses. It is important to mention at this juncture that the ratings across all the delivery systems for each media question were all above average (exceeded 3.00 on the 5 point Likert scale) except for Type 7 (partial interactivity) system on the question dealing the presenters's delivery.

Discussion

Instructional delivery systems for distance learners have changed dramatically over the past several years (Barker, Frisbie & Patrick, 1989). Professionals in greater numbers are making use of telecommunications technologies to deliver distance education. Increasingly various forms of interactive television are being used to deliver course work to distance learners.

This preliminary study was designed to assess the effectiveness of various television-mediated delivery systems in providing distance education to rural/remote learners. The findings must be interpreted with some caution because of the small subject pool for the Type 4 instructional delivery system.

In light of the average or above average ratings generated for each of the media evaluation questions, all of the delivery systems assessed in this study were effective in providing distance education to rural/remote learners. Also, four of the television-mediated delivery systems (Types 1-4) equalled or exceeded the ratings given to the "face to face" instructional delivery system (Type 5) in providing instruction to distance learners. A variety of reasons may be advanced for this outcome. Deprivation may play a prominent role in the average or above average ratings given to the television-mediated delivery systems. Historically, rural learners have had limited access to post secondary and post-bachelor's programs. In the past, distance education courses were provided through correspondence study or by extension faculty who flew or drove to rural communities to provide course work for interested learners. However, with the development of sophisticated microwave and satellite systems and the increased availability of video tape recorders, university instructors and classes can be brought to distance learners via television. For many distance learners, the wait is now over. Their appetite for learning can now be met quite conveniently with a number of instructional delivery options that provide for various forms of "real time" interactivity.

This study revealed a number of significant differences among and between the various instructional delivery systems. In comparing telecourses to conventional courses, significant differences were found between the Type 2 (tape of an interactive class) and Type 5 systems. This outcome is quite surprising realizing that the Type 5 instructional delivery system provides learners with "face to face" instruction and the Type 2 system provides interactivity through an on site facilitator/instructor. Again this outcome may be a function of deprivation. Distance learners may be "hungrier" than their on-campus counterparts and therefore rate the classes more positively than do their on-campus peers.

The questions dealing with the "amount of material covered" and the "difficulty of the course" produced significant differences between and among several of the delivery systems. Type 1 and Type 4 delivery systems were rated as covering the most material and as being the most difficult. In part these ratings may be a function of the restricted time span in which these delivery systems were used. The Type 1 system was used to deliver a three quarter hour course that was taught four hours a day for five days for two weeks. The same is true of the Type 4 delivery system. Distance learners did not have the usual 10-11 weeks to complete their learning activities. It may well be that these delivery systems work as well as others when the duration of the courses is similar to the duration of a normal courses.

Differences were also identified in the questions dealing with the clarity of the content presented in the telecourses and the relevancy of the instructional sessions to course objectives. The taped video delivery system with no on-campus class (Type 4) was rated significantly higher than the partial, two-way interactive television delivery system (Type 3) on both questions. These rating differentials may be attributed to several factors. The Type 3 instructional delivery system was used initially with distance learners when two different sites were being serviced through the interactive television system. Because of some of the early switching limitations of the interactive television system, the instructor could interact visually with only one of the rural classrooms during each class session. However, audio interactivity was always possible for all classroom sites during each instructional session. The lack of visual interactivity may have lessened the degree to which the instructor was able to relate to the distance learners and the degree to which the distance learners were able relate to the instructor. Another factor that may have influenced the rating differentials on this question was the inexperience of the instructor in teaching on television. The instructor had several years of teaching experience on television when the Type 4 service delivery system was used.

The differences established between the Type 4 and Type 1 delivery systems on question eight (integration of text and weekly assignments with the week's class) are difficult to explain. The texts and assignments for these delivery systems were identical. With regard to the differences found between the Type 4 and Type 3 (partial interactivity) delivery systems, the rating differentials are again probably attributable to the nature of the Type 3 delivery system and the inexperience of the instructor in teaching and planning for television instruction.

Course organization, the adequacy of instructor's delivery, the value of visual materials, the capacity of the programs to hold student interest, and the attitude of students toward the courses were not significantly affected by the instructional delivery system used. Instruction provided exclusively by various television-mediated delivery systems (Types 1-4) may be as effective as "face to face" instruction when the instruction is well designed and conscientiously carried out. Additionally, the experience of instructors in teaching on television as well as the degree of interactivity encouraged in each class session may contribute to the effectiveness that is achieved in delivering distance education through television.

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EFFECTIVENESS OF INTERACTIVE SATELLITE DELIVERY VERSUS TRADITIONAL DELIVERY IN SELECTED COURSES

Patricia J. Douglas, Ph.D.

ABSTRACT

Corporate Education Network (CENET) provides International Business Machines (IBM) with continuing education through the Interactive Satellite Delivery System.

The objectives of the study included determining if there were a significant difference in the scores of students on an achievement test and on an attitude scale between courses taught on the CENET and the same courses taught by the traditional method of instruction. Attitude was defined as perceived effectiveness by the student of content, teaching, objectives, interaction, graphics, exercises, and value of the class. The courses studied were cost accounting, application systems, and management.

Instruments for measuring achievement in each class were developed by experts in each field; validity was determined by expert examination of course content, objectives, and instructional tasks against the array of test items to locate areas of omission or incompatibility between instructional tasks and goals and test tasks. The Spearman-Brown split-half step-up formula was used to determine a reliability coefficient of 0.81 for the cost accounting test, 0.732 for the application systems test, and 0.696 for the management test.

Attitudes of students participating in the CENET courses being tested were measured by an attitude scale developed at IBM in the Technical Education Department.

Findings included:

1. For the cost accounting, the application systems, and the management courses, there was no difference in achievement between the delivery systems.

2. For the cost accounting, the application systems, and the management courses there was no difference in the way the students perceived the effectiveness of the courses.

Conclusions included:

1. Courses presented on the CENET were equivalent to the same courses taught in the traditional manner in terms of knowledge gained.

2. Courses presented on the CENET were perceived by the students as being of equal value as courses taught in the traditional manner, in terms of content, teaching, objectives, interaction, graphics, and exercises.

BACKGROUND

Satellite technology is perhaps the most significant advancement in training technology in recent years

(Greenhouse, 1987). Many large companies have seen the cost advantages of delivering training seminars via satellite, rather than flying employees into a central headquarters or sending them taped packages. If technology is going to be a successful instructional delivery system, evaluation of the system must occur to determine the effectiveness of the system as well as give direction for the future use of the system (Gibbons, Kincheloe, & Down, 1984; Hudspeth & Grey, 1986; Walshok, 1980).

STATEMENT OF THE PROBLEM

The problem that was addressed in this study was a lack of data to compare achievement and attitudes of students when given two different modes of instruction. Therefore the major concerns of the study dealt with determining if there were a significant difference in the scores of students on achievement tests and attitude scales between courses taught on the CENET and the same courses taught by the traditional lecture method of instruction.

OBJECTIVES OF THE RESEARCH

The specific objectives of this study were:

1. to determine if there were a significant difference in the scores of students on an achievement test between a cost accounting course taught on the CENET and the same course taught by the traditional lecture method of instruction.
2. to determine if there were a significant difference in the scores of students on an achievement test between an application systems course taught on the CENET and the same course taught by the traditional lecture method of instruction.
3. to determine if there were a significant difference in the scores of students on an achievement test between a management course taught on the CENET and the same course taught by the traditional lecture method of instruction.
4. to determine if there were a significant difference in the scores of students on an attitude scale between a cost accounting course taught on the CENET and the same course taught by the traditional lecture method of instruction.
5. to determine if there were a significant difference in the scores of students on an attitude scale between an application systems course taught on the CENET and the same course taught by the traditional lecture method of instruction.
6. to determine if there were a significant difference in the scores of students on an attitude scale between a management course taught on the CENET and the same course taught by the traditional lecture method of instruction.

PROCEDURES

The Participants of the Study

The participants included those IBM employees who enrolled in selected technical education courses during the early part of 1988. The participants included students in cost accounting, application systems, and management courses.

Thirty students from cost accounting courses, thirty students from application systems courses and thirty students from management courses were randomly selected from all the students enrolled in cost accounting, application systems, and management courses from IBM locations. The total number of participants was ninety.

Measures Utilized

The study was designed to control as many variables as possible. The same instructors were used for both the CENET course and the traditional course in each content area. The materials were identical; the amount of time given to each subject area was held constant

The post-test for the cost accounting course was developed by James E. Groff, Lawrence H. Hammer, Maryanne M. Mowen, and Charlotte J. Wright from the School of Accounting at Oklahoma State University. The tests have been in use for several years and validity was determined by expert examination of course content, objectives, and instructional tasks against the array of test items to locate areas of omission or noncompatibility between instructional tasks and goals and test tasks. The Spearman-Brown split-half step-up formula was used to determine a reliability coefficient of 0.81.

The post-test for the application systems course was developed by Rich Wills from IBM Technical Education, Dallas, Texas. Mr. Wills has been teaching the AS course in both the traditional and CENET classroom for some time. Validity was determined by expert examination as described for the cost accounting test. The Spearman-Brown split-half step-up formula was used to determine a reliability coefficient of 0.732.

The post-test for the management course was developed by IBM Management Development. The validity and reliability were determined in the same manner as the two previous tests. A reliability coefficient of 0.696 was computed.

A second instrument which measured attitudes was administered with the content test. These scales were developed at IBM in the Technical Education Department and this was in the form of a check list and open ended questions or comments.

Analysis of the Data

The study used a post-test only control group design with a part random procedure. In order to test for significance in this design, the t test was used.

Statistical significance was established at the .05 level.

CONCLUSIONS

The following conclusions were drawn from the findings of the analysis of the objectives:

1. Courses presented on the CENET were of equal value as the same courses taught in the traditional manner in terms of knowledge gained.
2. Courses presented on the CENET were as well received by the students as the same courses taught in the traditional manner.
3. The delivery system was not the deciding factor in whether a class was successful.

FOLLOW UP STUDY ON THE CENET SATELLITE INTERACTIVITY STUDY

The Flanders Interaction Analysis Categories was used to link teacher-student interaction to student attitudes and/or achievement in this phase of an on-going study. The specific objective of this phase of the study on satellite interactivity was an analysis of distance learning from the student perspective.

The specific objectives of this study were:

1. to determine if there were a significant correlation between interaction of the students/instructor and the amount of interest/lack of frustration the student demonstrated.
2. to determine if there were a significant correlation between the number of visuals used and the amount of interest/lack of frustration the student demonstrated.
3. to determine if there were a significant correlation between the number of visuals used and interaction of the students/instructor.
4. to determine if there were a significant correlation between administrative activities and the amount of interest/lack of frustration the student demonstrated.
5. to determine if there were a significant correlation between environmental factors and the amount of interest/lack of frustration the student demonstrated.

Various Uses by Instructors of PC-Based Audiographic Conferencing Technologies

by

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During the past four or five years, a rapidly increasing number of educational institutions in North America have begun incorporating computer-based audiographic conferencing technologies into their distance education programs. These technologies are chosen because they offer the potential of serving distant students at a reasonable cost, without requiring instructors to radically modify their classroom behavior. Because they are live communications systems, they maintain the real-time communications environment of the traditional classroom: the instructor is free to be spontaneous and to present information both orally and visually; students can participate in classroom discussions, can ask questions of the instructor and their peers and can create, view and discuss graphic and other visual materials.

The most versatile of these systems are comprised of a personal computer equipped with conferencing software and boards to support the creation, storage and transmission of graphic and still-frame video images; a graphics tablet and pen; an analog/RGB monitor or projector; a modem; audioconferencing equipment; and one or two regular dial-up telephone lines. Each site on the network has the same equipment, making it possible for any site to initiate communication. The sites are linked by telephone lines that are used to send the graphic and still video images and voice signal; if there are more than two sites, a telephone bridge is used to connect the sites into a single conference.

An instructor, or a technician, prepares computer graphic and full-color still video images in advance of the class session and stores them on a disk. Although these images could be transmitted in real time during class, most instructors do not choose to do so since the transmission time over the telephone line can range from 15 seconds to two minutes, depending upon the complexity of the image. Generally these images are either transmitted via high speed modem to each site on the network outside of class time, or copies are made onto floppy disks that are then mailed to the remote sites. During the class, any site on the network can call up the stored screens within seconds, in sequence or randomly, by touching the appropriate box on the graphics tablet, or key on the computer keyboard. Individuals at any site can use the graphics tablet and pen to point to portions of the images that are on the screen or to write on them for simultaneous viewing at all sites on the network. They can also clear the screen and use the tablet as a blackboard.

The fact that the technology does not demand a radical change in an instructor's classroom behavior has both positive and negative implications. On the positive side, it is not too difficult to entice instructors to teach on the system, provided they are given sufficient support. They do not have to face a camera as they must in an instructional television environment, nor do they have to do without the capacity to create visual teaching aids during class as is the case in a straight audio teleconference. If they are accustomed to teaching from overheads, or using the blackboard, they will find these capabilities are readily available to them with the audiographic system. On the other hand, it may be difficult to encourage instructors to critically evaluate their style and adapt it to the new delivery mode.

During the spring of 1988, with the support of the Annenberg/CPB Project[1], my colleague Sally Johnstone and I conducted interviews with faculty, students, and administrators involved in distance education projects using audiographic conferencing technologies at nine educational institutions in North America. From these interviews, and from our own experience over the past year in establishing and administering an audiographic network, we identified numerous examples of more and less successful instructional applications and strategies and the factors that influence their success.

One thing that became clear very early on is that audiographic conferencing is, ideally, a small group technology. In order to take advantage of the capacity for full interaction between and among students in various sites, and the instructor, the students at each of the sites need to be able to use the graphics tablet and pen for the exchange of visual information, and to participate in discussions. The fully interactive environment can counteract the sense of isolation that students often feel when they are not in the same physical space as the instructor. Individuals in the small groups at each of the sites support each other. When one of them is asked to present information or to answer a question, they may all confer on the correct response, thereby creating a collaborative learning environment.

Interestingly enough, some competition does arise between and among the different sites. Students at both the high school and college levels talked about how they were motivated by wanting to show students in other locations that their group was just as capable as the other groups and recounted their sense of satisfaction when they answered questions correctly or otherwise performed well.

A Canadian instructor designed her graduate education course to take full advantage of these characteristics. Students at each site were asked to read and report on specific articles, or to work together during class time to prepare a response to a discussion question, and to present their conclusions to the group, using the graphics table and computer keyboard to list key points or to illustrate concepts. To facilitate the latter exercise, the instructor prepared screens for each group with the discussion question across the top and a blank area below for use during the presentation. Unfortunately, the students were not sufficiently trained on the audiographic system to be able to use it in this way and had to deliver their presentations without the advantage of visual support. Partly in response to the frustration the students expressed with the audiographic system, the instructor developed and delivered mini lectures, for which she prepared screens in advance to provide visual reinforcement of the concepts she wished to convey. The students commented very favorably on the mix of small group exercises and presentations, general class discussions, and short lectures, but the instructor was frustrated by the students' inability to fully utilize the capabilities of the audiographic system.

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[1] A complete copy of the research report, "A Critical Review of the Use of Audiographic Conferencing systems by Selected Educational Institutions," is available for the cost of duplication and shipping from the International University Consortium, The University of Maryland University College, College Park, Maryland 20742.

Several institutions have used the audiographic conferencing technology to facilitate small group problem-solving and/or discussion sessions when the content of the course is given to students in print form or on videotape. This model has been used for many types of courses including engineering technology, statistics, and calculus as well as for non-technical disciplines such as history. In the most successful cases, the instructor prepared screens in advance to facilitate the sessions. In the technical courses, the screens displayed problems that the students were then asked to talk and work through using the graphics tablet and pen or keyboard, or that the instructor would solve in response to specific student questions. In the history course, the instructor led general discussions on issues that were central to the week's readings. He planned in subsequent semesters to use maps and other visual materials to illustrate the change in political borders or the advancement of troops during wartime.

The majority of instructors, however, choose to lecture for most of each class session with varying degrees of success. No matter what the subject matter, the most successful instructors follow a number of principles:

* Plan very carefully in advance how to integrate visual material into the presentation.

    This will frequently require the instructor to think in new ways about the material he or she is presenting. One English Literature instructor, for instance, drew a picture of a rose on the screen to represent the imitative literary theory and added thorns to illustrate the expressive literary theory and its relationship to the imitative. Others use primarily text to outline the major points, integrating non-textual material (diagrams, photographs, charts, etc.) when appropriate. Ideally, the instructor will be provided with resources to assist him or her in this process. These resources might include examples of screens that other instructors have used and a way to contact these more experienced users, and an experienced technician who can help him or her understand the graphics capabilities of the system.

* Stop the lecture frequently to ask, or solicit, questions or comments.

This helps to make the students active, rather than totally passive participants in the class and also varies the pacing of the presentation to keep the listeners' attention.

* Keep the screen active by pointing to, or circling, portions of the text or graphic material, or by changing the visual image.

The students at the distant sites concentrate on the screen, which serves as a substitute for the moving image of the instructor. When they see movement on the screen that coincides with what they are hearing, they are better able to pay close attention to the content of the lecture. One simple way to do this is to build sequentially on the information being presented. An instructor who is discussing the five levels of training would pull up a screen with LEVELS of TRAINING across the top followed by a brief description of level one. The next screen would contain all the information of the first, and a brief description of level two, and so on.

* Supply students with a written outline of the lecture and/or copies of the screens.

This written material both facilitates note taking and helps the students concentrate on what is being said rather than on writing down everything that appears on the screen.

* Develop a high tolerance for silence.

When the instructor asks a question of students he or she cannot see, it is impossible to judge whether the resulting silence is due to the students' active thinking or their total lack of involvement and comprehension. Frequently, the students at the remote sites are conferring among themselves and actively working on finding the answer. To the instructor, who usually cannot hear what is going on, the silence may seem interminable. However, breaking the silence too quickly will dampen the students' enthusiasm for answering subsequent questions.

* Try to maintain spontaneity and humor.

Spontaneity and humor serve to personalize and humanize the classroom experience, whether in a traditional classroom or distance education environment. Both can be difficult to maintain in classes that are taught via audiographic conferencing. Most instructors are very well prepared for these classes, planning out their presentation and the visual materials that will support it. Although they find this to be a positive thing, and even comment that they try to maintain this level of preparation in their traditionally-taught classes, many express concern that they are less able to be spontaneous themselves in the classroom, or to encourage spontaneous discussion on the part of the students. With a certain number of screens "to get through," they feel pressure to keep things moving. This same pressure can dampen the impulse to be humorous as can the impression that humor cannot effectively be used when people are unable to see one another. On the contrary, except in instances where the humor is physical, it can be readily conveyed through voice and graphic images.

* Take advantage of the unique capabilities of the technology.

High school students in rural New York State interviewed a rock star over the telephone as the final stage in a research project; a university instructor staged an interview of Thomas Jefferson; groups of students in different locations have engaged in debates; an artistic instructor used the graphics tablet and pen to make sketches of his students as they described themselves; groups of students at each location on a network transmitted pictures of themselves on the first night of class; and several institutions have arranged for students to use the computer outside of class time to participate in an electronic mail system that allows them to communicate with the instructor and with the other students and to conduct searches of on-line library databases. With the addition of VCR's to the basic audiographic equipment, instructors can tap into the rich resource of videotaped programs or schedule showings of tapes that they have produced for the course, which need not be any more sophisticated than focusing a single camera on a circuit board and having the instructor point out various features.

In order to ensure that audiographic conferencing technology reaches its full potential for distance delivery of education, it is essential that both the instructors and the students be given the training and support that they need to be able to use the technology effectively. The equipment itself is easy to use and the principles governing its effective use for education are relatively simple. It is up to the administration or managers of they systems to convey this information to the users, and to create a supportive environment that will allow the instructor and students to concentrate on what is being taught and learned, rather than on the technical means for communication.

COMPUTER CONFERENCING AND THE DISTANCE LEARNER: PROBLEMS OF STRUCTURE AND CONTROL

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Computer Mediated Communication (CMC)

Interest in computer conferencing as an instructional methodology has been growing due to the accessibility of telecommunications and computer networking. Computer mediated communication (CMC) is increasingly being used as a supplement to or as the sole means of communication and presentation in education courses that are being offered in many parts of the world.

The British Open University offers numerous multi-media distance education courses aimed at large numbers of home-based students. The Open University has integrated the use of the CoSy conferencing system into some of its courses. Integrating computer communications is seen as a vital and exciting component for students to gain practical experience of the social and technological issues discussed in the course materials.

The Ontario Institute for Studies in Education, located in Toronto, Canada, uses the OISE's Participate System. They offer off-campus courses, supplement distance education courses, and are experimentally offering courses that are solely CMC.

Connected Education is a computer conferencing network utilizing the Electronic Information Exchange System of New Jersey Institute of Technology. They offer a program that enables students from around the world to take courses toward a degree in Media Studies. The program is in its fifth year of providing students the opportunity of taking courses in their homes or businesses using any microcomputer with a modem. The Connected Education network includes: an on-line library; book ordering service; "cafe" for casual conversation; and a mail system. Students can call up classes at anytime. Special times are set aside for on-line interaction with faculty.

Benefits of CMC

There are many benefits claimed for using computer mediated communication in education. Computer mediated communication can provide a democratic environment for group interaction and learning. Using CMC provides all of the participants with a record of the entire course. Words of wisdom are not lost to inefficient notetaking. Another benefit of this record (trail) is that students don't miss any of the instruction due to absenteeism or daydreaming.

It has been found that when using CMC, more students respond to content, questions, and ideas, and the responses are longer and more complex than in a traditional classroom. Interactions are increased since students are given the opportunity to respond to each others comments and work, thus the students learn from each other and receive encouragement, and direction. Explanations and teacher comments also become more interactive.

Branching capabilities are an added benefit. When new or different topics are introduced, they can be treated separately so as not to disrupt the principal topic. Instructors are able to participate with all of the small groups within a class, monitoring and assisting much more effectively.

Some Problems With CMC

There are also problems that need to be addressed when using CMC as an integral part of a course. Some of these spring from the asynchronous qualities of the communication process. Unlike face-to-face instruction, or real-time teleconferencing, in which the participants communicate during one fixed period of time, CMC allows one to choose when to respond to another participant's comment. This offers the above mentioned benefit of allowing one to think out a more structured, more complex response, and the benefit of being able to participate at times that are personnally convenient. This same factor can also generate communication difficulties. One problem is that it may promote procrastination, leaving the response for later, and perhaps in some cases, failing to respond altogether. This adds to the complexity of the developing structure in that students may, at any time, be inputting new comments related to different stages of the development of the topic. Not only is the discourse "multi-level" in that several different topics may be in simultaneous discussion, but it is also "multi-speed".

Some other problems are associated with the medium of communication. In addition to the necessary procedural skills which are needed to use a CMC system efficiently, some students are reluctant to committing their comments to print, more than they would be of making a spoken comment in class. They may log on and read the discourse, but give no sign of their presence (the so-called "lurkers"). On the structural side, the permanent quality of print, in addition to offering the advantages outlined earlier, also creates a problem of sheer bulk. A lot of reading and rereading is required to keep a clear structure of the development of the discourse in mind. Alternatively, some form of regular editing and structuring of the content must be performed.

A third problem originates from the distance communication aspect of CMC. Although distance communication allows one to participate in a discourse which may otherwise be impossible, it also introduces some difficulties of control of the discourse. The instructor loses some of the benefits offered by a face-to-face group situation. When the discussion drifts off the topic, it often takes longer, and is more difficult, to bring the group back on task. There is also the problem of knowing who is/is not participating. There is only knowledge of who is contributing. How can we know who is "lurking" in the system, in order to try to draw them into the discourse? From our experience, general exhortation does not seem to work well at all. Personal messages work much better, but have to be directed to specific people.

Why Use CMC: What Type of System?

The relevance of the above mentioned problem-areas depends on the specific system and its purpose. Traditionally, CMC has been used as a user-driven conference system (hence the popular term "computer conferencing"). This implies that a group of individuals exists, who choose to debate a topic of mutual interest. They may be in search of new ideas and may view a change in the direction of the discourse, as a positive development. Also, individuals may join in or drop out of the discourse, in relation to their own interest in the main topics under discussion. The continuance of the discussion is controlled by the existence of a "critical mass" of interested discussants.

Another common use of CMC, is as an information system, as exemplified by the proliferation of bulletin board systems. Their primary purpose is to offer a special-interest-group information-sharing service.

A growing use of CMC, is as a social communication system. This use is of growing importance in distance education. It provides students with the opportunity of social interaction with other students, which is often a missing component in distance education. The experience of the British Open University, in using CMC for a year on a course with over 1200 students, showed that from the students' point of view, this was the most used and most valued function of CMC (Bates, 1988).

Our main interest, is to examine the use of CMC as part of an instructional system. It is in this context that many of the advantages and problems discussed earlier, are of greater importance and relevance to the designer of instructional systems.

Using Computer Mediated Communications for Instruction

Computer mediated communication is a qualitatively different medium for instruction. When designing instruction for CMC, it is important to consider the strengths of the medium and to focus attention on the learner.

Within a structured course there are a number of learner-centered strategies that will facilitate learning. These strategies model those of a group leader. The three main functions that the instructor (leader) needs to perform include: setting a congenial, nonthreatening climate; facilitating group interaction and progress; and providing group maintenance.

Setting the climate helps to ease the transition of students to both a new course and possibly a new learning environment. In order to accomplish this the instructor can use the following strategies:

- leave a personal welcome message for each student;
- reinforce early attempts of participation;
- reference student responses in your comments;
- send students individual (private) communications that provide feedback and suggest resources or possible relationships with other responses.
- model expected behavior concentrating on content and thought provoking ideas, rather than such things as keyboarding skills and formatting.

The following are suggestions for being a group facilitator.

- Keep the main discussion on track by providing leading questions.
- If the discussion starts getting off track, refocus.
- If a distracting topic appears that is generating interest, create a branch so that the competing conversation is separate and optional.
- Focus efforts by suggesting that students look deeper into topics when applicable.
- Provide summaries of what has been transpiring by drawing together main themes.

Group maintenance includes such duties as mediating differences that become obstructive, and making comments pertaining to the groups progress.

There are additional factors that need to be considered when offering a course using CMC. First, it is helpful is students are instructed to limit their responses to one-to-two screens. It is difficult to read long texts and to follow an argument through lengthy text on a computer screen. It is also helpful if students have the ability to download and print. Another issue is the accessibility of terminals. This is more of an issue when students are participating in a CMC course on a University campus. Most distance education CMC courses require that the student purchase or lease a micocomputer. Students also need to be provided with technical information and help with technical problems.

When CMC is expected to promote instruction, students need to be provided with very clear guidlines as to what is expected from them (including the frequency of their participation) and how to participate. We have tried a number of strategies, such as: supplying precise objectives, in writing, for the outcomes of the computer-mediated exercise; supplying a position paper to react to, with specific questions built into it; and building specific computer-mediated tasks into course assignments (some evaluated and graded by CMC as well). All of these strategies have helped, but none have been successful in overcoming all of the problems that we outlined earlier. We still get a few "heavy" participants and a lot of "lurkers". We still find that much of the discussion wanders far from the objectives set up for the exercise. We still find that our control over the process is limited. Students still get lost in the complex structure of interweaving themes that appear in the discussion.

Use of Email vs a Conferencing System

Some conferencing systems provide a complex structure to help organize the materials of the conference (or course). The structures are generally set up using some kind of metaphor of an educational system. These structures often make it difficult for the new user to remember where in the structure they are and to remember how to move among the levels.

Apart from the difficulty of learning the technicalities of using the system, students often input comments in ways that do not fit well into the existing structure. This creates the need for a course "moderator" (who may or may not be the instructor) to regularly monitor the incoming messages and transfer some to new sub-conferences or small-group discussion spaces. This task must be done regularly, otherwise many participants may respond to a "maverick" comment and distract the attention of all from the mainstream discussion, possibly irretrievably. It must also be done skillfully, otherwise many participants may disagree with the structure being imposed by the moderator and may feel that the conference is being "censored" in some way.

A simpler and more generally available alternative to the use of a specially structured conferencing system, is Email. We have been using Email systems in conjunction with Bitnet, to run several CMC conferences and seminars, often linking several internationally located sites. No attempt was made to impose a centralized structure through the system. Indeed, the limitations of the Email systems we have been using prevent us from doing this. We have not, therefore used moderators, although the instructors involved would attempt to define an initial structure in an opening "position paper". We have then encouraged each of the participants to map their own view of the emerging structure.

Attacking the Problem of Structure

Using Email, the student can organize the course materials into notebooks that are personally meaningful. The students can be provided with some basic initial structure which separates course content from personal communications. They can also be given some suggestions for organization. One time-saving aid to understanding and organization is to encourage students to title their responses so that others are able to quickly recognize what the note's content is in response to.

Further organizational tools which help the student in following the often interweaving subtopics, is to download and organize messages and to create pattern notes of the topic areas which show the interrelationships that may exist. The students can also benefit by comparing their structures with each other. Instructors can organize related topics, ideas, etc. and send them to students for additional discussion. The students active involvement with the content structure leads to a more meaningful understanding and greater transfer of the new knowledge.

There are also hypertext shells that could be used for organizing the course content as it evolves. The usefulness of the tool should be weighed against the additional time committment that would be necessary for the students to learn to use the tool. This is the focus of our current research.

Up to now we have been experimenting with techniques for organizing and structuring the discourse, based on edited hardcopy filing systems supported by pattern notes or network diagrams, and on multiple-notebook electronic filing that uses the existing capabilities of our Email system. Both these approaches are promising, but also have their practical problems and limitations. This work has given us insights into the desired characteristics of a CMC-organization tool that could reside on the disk of a participant's computer. Current work is focussing on the design of such a tool.

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DEVELOPING HYPERMEDIA FOR THE LEARNING ENVIRONMENT

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Introduction

Hypertext is a concept of computer information retrieval which is rapidly moving from the research environment into educational applications. The initial exploration of hypertext has been done primarily by computer scientists. However, as computers increase in capabilities and become more accessible and affordable, a variety of professionals, including educators, are beginning to develop hypertext applications. The focus of this paper is to discuss an interdisciplinary effort in the development of a hypertext/hypermedia prototypic system for an advanced military officer course[1]. This system is intended to be used by military officers in their professional work settings after course completion.

The Concept of Hypermedia

When an individual uses traditional printed material to learn about a topic, he/she typically begins reading on page one and proceeds through the last page of a document. Documents are usually comprised of a series of increasingly complex ideas which are interlinked. Individuals may find the traditional (i.e., linear) way of reading time-consuming. When looking for specific information, he/she may need to turn back and forth between the text, the table of contents, and the index. For the reader, sentences, paragraphs, and illustrations can potentially be scattered throughout a book on a variety of ideas pertinent to his/her needs. Furthermore, references and bibliographic entries act as links to other documents.

A computer can be used to store vast amounts of linear text accessible through word processing programs. In these programs, however, linking between concepts and to other documents is similarly difficult. A different approach, called *hypertext*, facilitates representing and using links between text in documents. With hypertext, individuals can bypass extraneous information and focus upon topics that meet their immediate needs.

For example, in reading about a procedure, a professional may come across an unfamiliar concept. Traditionally, this reader would likely continue reading the material hoping the concept is unimportant, unnecessary to understand fully, or will be explained later in the text. The capabilities of hypertext can allow the reader to "jump" immediately into an explanation of the unfamiliar concept through a link to another text. After reading as much as needed about this concept, he/she can instantly return to the information of primary focus. The process of putting a task "on hold" while concentrating on a smaller portion of it can be repeated as often as necessary, if built into the hypertext design.

In addition to using text, other media including charts, tables, graphics, pictures, numerical data, music and/or video can be incorporated depending upon the available technology. When other types of media are utilized in the system, it becomes a hyper*media*. The user can read information or, depending upon the hypermedia design, interact with the computer to perform such activities as calculating mathematic functions, drawing graphic pictures, and editing text (Young, 1987; Oren, 1987).

Hypermedia Research for Educational Applications

At the present time many research projects are focusing on developing hypermedia for educational uses. Hypermedia development and use received a stimulus with the release of the commercial products Hypercard for the MacIntosh and Guide II for the IBM-PC. Unfortunately, commercial packages can constrain authors to the conceptions of the product designers. For example, Hypercard allows users to move from one card to another but does not permit links from text on one card to text in another. It uses, therefore, a "page-turning" philosophy. Even with these constraints, Hypercard is being used for educational delivery. For example, the University of Illinois at Urbana-Champaign Department of Sociology established a hypermedia laboratory utilizing Hypercard exclusively (Jones, 1988).

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There are several present applications used in educational environments. A pathology knowledge-base system was developed at the College of Medicine, University of Illinois at Urbana-Champaign to support instruction of pathology courses (Thursh & Mabry, 1980; Thursh, Mabry, & Levy, 1988). At Brown University, researchers are developing a hypermedia system, called Intermedia, for biology and English literature courses (Yankelovich, Meyrowitz, & van Dam, 1985). Other projects are moving to developing systems to enhance active learning participation. A project at the University of Aberdeen in Scotland is using computers to explore concept mapping by experts to develop hypermedia systems. This team suggest four broad uses of these systems in education: didactics (*teach me about...*), encyclopedia (*tell me about...*), dictionary (*what is a...*), and simulation (*what would happen if. . .*) (McAleese, 1988). In addition, a Carnegie Mellon University project is utilizing primary historical data such as census information and presidential election data that permits undergraduates to engage in historical research (Miller, 1988). Students are given issues to explore such as literacy in the mid-1800s and utilize a variety of data to address the issue.

The Development of a Hypermedia Prototype for a Military Professional Education Environment

The purpose of the project was to design and develop a pilot electronic storage and retrieval software system to be used during and after an advanced twenty-week residence course for officers who are army engineers. The number of specific tasks potentially performed by an army engineer is immense (At-Taras & Williams, 1986). The official documentation of these tasks can be found in approximately 58,000 pages of written manual materials. The students of this course are expected to scan, read, or study much of these materials. Training for all tasks, however, cannot be accomplished during the twenty-week course, and those tasks which are not used frequently during and after the course are likely to be forgotten. Since computers have the potential to allow rapid access to vast amounts of information when needed, they have the potential to assist the military officers to learn job tasks not only at the course but also in the work setting.

Project staff members are from the Microcomputer Systems Laboratory, an interdisciplinary research laboratory which focuses upon the use of technology by professionals in learning and work environments. A main research thrust of the laboratory for a number of years has been the development of knowledge-base systems for educational use (Thursh & Mabry, 1980; Thursh, Mabry, & Levy, 1986). The project staff members included: a computer scientist, a continuing professional educator, an educational psychologist, and an educator specializing in human / computer interface.

Research began with a visit to the school to understand the learning environment, use of manual materials, and professional culture of the army engineer. Activities during the week included: class observation, interviews with instructors, inspection of course materials and related course manuals, viewing videotape materials, computer laboratory site visit, discussions with computer laboratory personnel, computer software review, meetings with student groups, and observation during field operations in a tactical exercise without troops.

The staff learned that the primary foci of the course are problem solving and information application in scenario-driven lessons. To accomplish these goals, the **Command Estimate Process** is the overarching principle driving the course. The process is presented as a linear model which includes mission analysis, situation analysis, analysis of course of action, comparison of courses of action, and recommendation / decision. As with many professional problem-solving models, the command estimate when used in practice by experienced practitioners becomes a dynamic process rather than a step-by-step approach.

To instill a sense of professionalism, emphasis is placed upon team-building, a philosophy which is pervasive throughout the course. For example, even the final examination, called the "capstone exercise", is performed in group situations. The rationalization is that in real-life situations the engineer must function as part of a team in order to meet the objective. Therefore, group interaction is not only highly valued but also essential for successful completion of the course.

Several main issues emerged from the site visit. These were considered to have implications for development of the project prototype and future educational hypermedia applications. These issues are:

1. ***Computer Negativism:*** At the school, there was a attitude of negativism toward computer / technology usage by many instructors, students, and military personnel in general. During small group discussions with students, the project staff members observed considerable concern about computer usage by army engineers. Examples of this attitude include: skepticism about computer reliability in the field, fear that overdependence on computers in training will leave engineers in the field incompetent, strong resistance and discouragement by commanding officers to personnel use of computers, and expressions of past computer equipment/software failures. Instructors appeared somewhat more sympathetic, realizing that technology could be used to enhance the instructional process. They did, however, express concern about instructional technology detracting from team building and isolating individual students. Most students and instructors could not envision a computer educational technology other than computer-aided instruction (CAI), programmed text, or expert systems.

   The director of the school's computer laboratory noted, however, a significant difference in computer acceptance between students in the advanced and basic courses. She attributed the attitude difference to the increased computer literacy of the younger officers who have "grown up" with technology. This variation is probably similar to the general population.

   The implication of negative attitudes on future information system development is that designers must take into account the users' environment. No matter how functional the system, support for all levels of use in the classroom and the field must be given. This support ranges from design of the human interface to introduction and implementation assistance in the learning and work environment. With the aging of the technology-familiar cohort, this process is likely to become less complex.

2. ***User and Purpose Clarification/Identification:*** Throughout the visit, a question continually emerged as to who was the end user of the system: the instructor, the student at the course, or the practicing army engineer. An information retrieval system must be designed in light of the needs of its primary user. Anticipated use will affect whether it is designed to function as an encyclopedia or dictionary (reference), or as a (tutorial) supplement to the instructional process.

3. ***Rapidity of Information Change:*** Like most professionals, army engineers are experiencing continuous changes in information. In addition, the engineer school views itself as influencing doctrine development and formation. An important issue is responsibility and commitment to updating an information system with these changes.

4. ***What is the "Real" Information: Practical or Textbook Knowledge:*** A major source of professional knowledge is practical experience (Schon, 1987). Often this knowledge is so routine to a professional, it cannot be explained or conveyed to others. This reliance on practical knowledge became apparent several times during the site visit. During this course, much of what is taught is developed explicitly by the instructors from their own experience, making little use of the manuals. Course content is communicated with "rules of thumb", experiential stories, and anecdotal comments. This issue has implications for integration of information retrieval systems into learning environments and use in learning at a distance.

5. ***Access to Content Specialist:*** It was obvious during the site visit that instructors at this school are extremely busy. They were gracious to the staff members and supplied manuals and lesson plans when requested. However, they did not have the time during or after the visit to devote to this project. Project staff members had to learn to work efficiently with context specialists to build the hypermedia system.

Shaping the Project

The topic area "Intelligence Preparation of the Battlefield" was selected for the prototype development. The instructors identified a manual Command Estimate (ST 100-9) as an appropriate text to use for the project. The project staff members read the selected text to understand the IPB process. The first task was analysis of the underlying structure of the written materials in the Appendix of the Command Estimate manual. Many problems were noted in the structure of this material. For example, a subheading may run for 26 pages before the next subheading is found. Therefore, it is often difficult to follow the logic in the structure.

After becoming familiar generally with the topic, project staff members met with an Army captain from another division, who was working with the Microcomputer Systems Laboratory while studying in graduate school at the University of Illinois. During these sessions, the captain was interviewed to elicit his understanding of the IPB process. An outcome of the interview was the development of a concept map of that process.

Concept maps utilize a technique which displays ideas from a text, or in this case from an expert, in the form of a diagram (Armbruster & Anderson, 1984; West, Farmer & Wolff, in press). The technique has been used to enhance learning by educators. During this project, the technique was used to produce a structure as a basis for hypermedia development by locating texts, graphs, maps, and references within other manuals which are related both directly and as prerequisite knowledge to the IPB process. In addition the concept map was incorporated into the software system to allow users to utilize it as a basis for text selection.

After the interviewing and manual selection process, the process of transferring perceptions of IPB into a computer organization began. Because of insufficient access to content specialists from the engineer perspective, the structure from the IPB Appendix was used. The textual and tabular information from this Appendix was incorporated into a hypertext system. In addition, the perspective of the visiting captain was utilized to clarify and validate the structure from the Appendix.

At this point, the concept of IPB was illustrated through a hypertext called "Hypermedia for IPB". In this prototype model, there are features such as the glossary, legend of military symbols, and map displays that demonstrate potential development areas. These features will be more fully developed in the future with content experts and/or instructors. The hypermedia functions on a standard IBM-PC with a hard disk and enhanced graphics display. It supports the presentation of text and graphical materials needed for this application. Since terrain maps and concept maps were important for these users, they are highly integrated into the operation of the system. Unlike Hypercard, this prototype is a true hypermedia, and unlike Guide II for the PC, it does not require a special windowed operating system to run.

In addition, this prototype adds features useful in an educational setting including: the ability for a user to keep track of what information they have used in the system, the ability to leave "bookmarks" for later reference, and the ability for instructors and course participants to communicate through commentary information added to the basic hypermedia.

Recommendations for Future Development and Use of the Hypermedia System

1. **Exploration of Use of Hypermedia in Educational Environments**: One of the goals for continuing professional education is to encourage self-paced, self-directed learning activities. Because self-direction is one of hypermedia's strengths, a user can explore a content area in a non-linear method, guided by his/her own interests. Hypermedia for IPB has additional features for personalization such as bookmarks and comments, that are added by users and can be shared with other users. How these systems will be used in concert with traditional learning strategies, however, is open to exploration.

2. **Exploration of Use and Learning in the Workplace**: The speed at which knowledge is expanding may make it impossible for a professional to ever be fully "up to date" (Nowlen, 1988). In addition, information which is not immediately used by the professional and soon incorporated into practice is often lost. This information can be accessible through a hypermedia. Furthermore, if a professional dedicates large amounts of time to maintaining current information, performance aspects of their profession may be

overlooked. Research is needed to understand how hypermedia can enhance use and learning in the workplace by a wide variety of professionals: by field and experience.

3. **Spatial Learning Strategies:** Several strategies for facilitating the use of information in practical applications have been investigated by the researchers affiliated with the Microcomputer Systems Laboratory (West, Farmer, & Wolff, in press). One strategy, *concept mapping*, was used in three phases of the development of the IPB hypermedia: 1. information transfer from the content expert, 2. the project staff members were able to understand the content area, making it easier to enter the information into the computer, 3. graphically displaying the concept map as a basis for text organization. Making use of the ability of a computer to portray graphically the relationships among concepts can greatly enhance the utility of a hypermedia. Other spatial learning strategies include frames, grids, spider maps, and chain and process maps.

Conclusion

An interdisciplinary effort to develop a hypermedia for use in a military educational setting has resulted in a system prototype that supports the specific needs of the instructors and students in this setting. This development was accomplished by interviewing these users to determine their attitudes and thoughts regarding the integration of a computer program into their instructional and professional environment. Current continuing education theory was then applied to their informational needs and supported by the software package developed specifically to meet these needs. Further testing is planned to validate the actual utility of this prototype in formal learning settings and professional environments.

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Level Two Interactive Laserdisc: A Low-Cost Alternative for Active Distance Learning

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Introduction

Technological developments related to the dissemination of information are occurring so rapidly that trying to keep up with them is becoming increasingly difficult. Educators, the key purveyors of formal learning, must attempt to comprehend and utilize these new technologies in order to disseminate tremendous amounts of information to an increasingly diverse population.

As educators search for efficient, effective and flexible alternatives to traditional delivery systems, consideration must be given to interactive laserdisc media. Unfortunately, acceptance of interactive laserdisc technology has been slow in education when contrasted with other environments such as health, marketing and the military. However, the speed of education's acceptance of microcomputer technologies suggests that educators will accept and invest in new technologies on a wide scale once efficacy has been demonstrated.

The potential applications of interactive laserdisc technology in distance learning are numerous. These include: use as an archive (e.g. random access to video material for instructor or student use), video demonstrations with a high degree of control (i.e. clear freeze frame, slow motion, reverse, search, etc.), interactive lectures, a dynamic textbook for student remediation and review, dynamic testing, and interactive instruction using simulations.

The key advantage of this medium for distance education is that it enables students to "participate" in consistently high quality instruction at any location or time, with flawless instructional continuity.

Interactive laserdisc systems enable students and instructors to randomly access up to 54,000 frames of high-quality video images or text within 1.5 seconds. Access can be achieved through manual input or through a computer programmed command. Programmed commands for the laserdisc can originate from either an external computer (commonly referred to as "level 3" systems) or a processor built into the player which reads program code laid on the laserdisc itself (referred to as "level 2" systems). In either case, the media provides several unique instructional features. First, it allows the presentation of instructional material paced to individual or group needs, maximizing instructional efficiency. Second, it provides opportunities for trials or simulations with immediate feedback, reinforcement or consequential illustration. Third, it provides the ability to test comprehension in various contexts as well as knowledge. Finally, it provides remedial activities tailored to student needs as indicated by laserdisc-based tests.

The efficacy of Interactive Laserdisc Technology in Education

Bosco (1986) reviewed 28 studies of interactive laserdisc programs in military, and education. Within the 28 studies were 39 comparative reports of effectiveness involving the use of statistical tests. In 24 of the 39 instances (61%), there was a statistically significant positive finding for interactive laserdisc-based instruction over other methods. Bosco also found that according to the studies reviewed, interactive laserdisc instruction tended to reduce mean training time while increasing training time's standard deviation. He concludes that "One rationale for interactive video is to accommodate differences among learners, and large standard deviations for training time indicate that such is occurring..." (p. 14).

DeBloois (1988) reviewed 30 studies of interactive laserdisc-based instruction in education, military, and industry. DeBloois' analysis indicated that the technology produced at least as much learning as traditional approaches. Among recent studies employing more sophisticated laserdisc designs, DeBloois found reports of greater achievement, problem-solving ability, and retention than traditional methods in reduced learning time and at lower cost. In addition, DeBloois' analysis indicates suitability of the technology in skill and concept learning, enthusiastic acceptance by learners, and effectiveness in both group and individual instruction. He also found that those included in the analysis prefer mixing interactive laserdisc instruction with classroom experiences, group discussions, or hands-on experience.

Level-2 Advantages for Distance Learning

While the benefits of interactive laserdisc learning over other media (e.g. video tape, text, etc.) have been demonstrated in research, questions remain over interactive system configuration. Level-2 interactive laserdisc systems offer two unique benefits (over other interactive laserdisc configurations) in distance learning settings. These are operational simplicity and cost.

Operational Simplicity

Level-2 interactive laserdisc systems require only a single piece of hardware, an appropriate disc player. The level-2 disc player contains a built-in storage device capable of holding sophisticated computer program commands read from the laserdisc itself. These commands provide instructions to the player to read or play various disc segments in response to respective student inputs.

Student inputs are made through a simple remote control keypad, similar in appearance to that used with televisions and VCR's. The remote control as input device adds yet another element of operational simplicity. Such a device lacks the often threatening nature of computer keyboards and the unreliability of touch-screen monitors. In addition, the remote control device facilitates use of the interactive laserdisc in groups as the device is easily passed from one student to another.

The laserdisc player is connected to any television using simple RF, RCA, or 8-pin connectors. While the main benefit to this is cost (use of inexpensive televisions versus more costly computer monitors), the operation of a television is typically a more "user-friendly" experience than operation of the typical level-3 monitor.

For a typical distance learner, the following steps would be followed using a level-2 configuration:

1. Power on television and disc player.
2. Load appropriate laserdisc by pressing the open/close button on the laserdisc player, placing the laserdisc on the slide-out laserdisc tray, and again pressing the open/close button.

Once the laserdisc is loaded, computer command dumps are read by the laserdisc player which blueprint a highly sophisticated learning experience. Once the dumps are read (5-15 seconds), students may select from a menu appropriate instructional modules, messages, simulations, still frames of information, or other learning activities.

Level-2 Cost Benefits

Level-2 interactive laserdisc configurations offer several direct and indirect cost advantages. The direct cost savings of level-2 as compared to level-3 systems ranges from 50 to 500%. At the lower end of the savings range the level-2 system is compared to "home-made" level-3 systems offering little or no compatibility with the level-3 course ware market. The predominant level-3 system is 400-500% more costly than the top quality level-2 player. In addition, level-2 course ware typically costs less than a level-3 counterpart with few if any discernable differences to the learner.

There are also several indirect cost benefits of level-2. First, level-2's compatibility with any television eliminates the need to acquire costly computer monitors. As typical distance learning environments currently have televisions (used in VCR configurations), the cost of acquiring a viewing instrument is eliminated.

A second indirect yet significant cost benefit of level-2 is hardware portability. To the distance learning coordinator this means significant cost reduction as single systems can be shared by multiple locations. The ease of connection to a television facilitates equipment sharing. The increasingly smaller versions of level-2 players also facilitate equipment sharing. Units as light as 10 kilograms (23 pounds) can be transported in light weight padded cases with shoulder straps that fit under an airline seat.

Finally, the level-2 laserdisc player presents few if any compatability issues should a level-3 configuration be desired. The prominent level-3 interactive laserdisc systems can be configured with any of the prominent level-2 players.

Summary

Level-2 interactive laserdisc for distance learning has been successfully implemented in numerous industrial environments. Utilization of this technology in educational settings is a natural extension based on the instructional benefits of interactive laserdisc training in general, as well as the cost and operational simplicity advantages unique to level-2 configurations.

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Moving Independent Study into the 1990s: Tapping Communication Technologies

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Nineteen ninety-two will mark the 100th anniversary of correspondence study in the United States (Dunning 1987). What is remarkable about this form of distance education is *how little it has changed* over the century. The correspondence format seems to have survived a plethora of predictions of demise in the face of dazzling technologies (Pittman 1987). Clearly, there is something about courier exchange of printed material that works, and like the man says, "if it ain't broke, don't fix it."

Correspondence study offers advantages over traditional learning formats. Foremost is the student's flexibility to learn wherever and whenever he or she desires. This flexibility seems to be the secret to its persistence. There is a cost, however; the student loses the quick feedback, evaluation, and support available through almost all other formats. This learning system works for millions of students each year, but selects for students who can work within these limitations. Those who frequently seek interpretation of course material or assignments and students who study intensively (or lack the discipline to proceed at a slow pace), however, are selected against.

In this session, I examine the application of technology to one aspect of the correspondence course format: the transmission of lessons and correspondence between student and grader. The technology is electronic mail. Electronic mail is one way to overcome some of the limitations of mail-delivered correspondence material. The student benefits from increased turnaround time for lessons as well as better access to the instructor. I suggest this technology comprises a logical addition to the traditional format and provides benefits to student, grader, and institution.

Electronic Mail

Electronic mail developed as a concomitant of timesharing computer systems in the late 60s and early 70s allowing users to send electronic messages to others on the same machine. The public telephone network was soon employed for remote access to the computers. This modem-based telephone communications characterized most electronic mail systems through the late 1970s, and is still quite popular today. The availability of affordable personal computers has resulted in an abundance of electronic bulletin board systems.

Case Study

In 1987, the Department of Engineering Professional Development at the University of Wisconsin began testing a low-cost communications system designed to broaden the audience for correspondence courses by overcoming some of the limitations. Our goals were (1) to eliminate the 2-4 week delay from mailing lessons to and from students, (2) to allow students and instructors to exchange questions and answers quickly, and (3) to reduce delays and costs incurred from manually routing lessons to and from instructors. We developed a system, *Textlink*, that is basically a fancy electronic "bulletin board." Students use their modem equipped computers to drop off newly completed lessons, pick up graded lessons, present questions to their instructor, and receive the instructor's responses.

The initial course offered via *Textlink* is called *Programming the 8086 Family of Microprocessors* (McCall, 1987) and will soon be supplemented by Pascal and LISP programming courses. We find this system has some advantages. For instance, the course instructor, who occasionally is out of town consulting, is able to access the system via a toll-free number to grade lessons on the road. There is certainly a reduction in handling costs since the instructor receives material directly from the student. The system is flexible; students without modems return their lessons on floppy disks instead of using electronic mail.

The system has limitations as well. The most frequent complication is the difficulty some students have using their modem and software. Those who are less technologically inclined will tend to experience more of these problems. Also, the system limits individual grading style since it is not possible to write comments on the assignments in the traditional way. Critiques of students work must be written as a separate file or appended to the end of the student's submission. This system creates new responsibilities for the instructor, who must log into the system each day to check for assignments and questions. This requires some of the instructor's time each day regardless of enrollment. This is added overhead for courses with low enrollment.

Networked Electronic Mail

A supplement to telephone-based communications is electronic message transmission over the' 'InterNetworks." Over the last two decades, an international computer communications metanetwork, sometimes called *Worldnet*, arose. These networks, often without formal structure or funding, originated as telephone hops between the computer science units at colleges and research centers. Today, these formerly underground networks have become "established," interconnected, and joined by well funded research and military networks. There are hundreds of wide-area networks around the world that provide electronic mail services and most are interconnected. For a comprehensive though somewhat dated review see Quarterman and Hoskins (1986).

These networks have the potential to be used as a communications backbone for national and international correspondence courses. Already, these networks form a communications backbone for many communities - initially computer science research communities. University students have been using these networks many years for personal correspondence. Many corporate communications networks also contain bridges into Worldnet; in 1986, there were an estimated 60,000 users on Digital Equipment Corporation's Easynet. UUCP, the oldest of the mail-hop networks, had an estimated 200,000 users in 1976. There are probably a half million users today.

There is a universal, worldwide trend toward increased access to electronic communications (ignoring the tremendous availability of public phone systems and commercial networks like TYMENET and TELENET). Worldnet should mature over the next few years. Traditionally, it has been a battle to figure out a network address for a user on another network (and sometimes an address on the same network). Electronic mail addressing on many networks is undergoing standardization (Gerber, 1989).

Many of these networks are available for use now. Production or modification of courses that appeal to the technical and scientific researchers and students are most likely to succeed in them. Couses in computer programming, statistics, engineering, and technical writing probably appeal to many of the network users.

Getting Started

The first step is very easy: become a user of electronic mail. This requires a personal computer, communications software package, modem, and phone line. There are an abundance of bulletin boards available that would welcome your contribution. See your local computer Guru for a phone number. A second step is to use network electronic mail. Most campuses have many outlets for electronic mail, e.g. departments with minicomputers, administrative computers, and central computer centers. Find a few people to send mail to and use it every day. Again, a local computer Guru can help you log in to the system, learn how to use the mail system, and find mail addresses.

Should you decide to produce a correspondence course using electronic mail, some computer expertise will be required. This may be a consultant, a graduate student, or an expert from a local computer center. You will have to understand the type of material that can be transmitted and graded as computer text files in order to develop or convert the course material. The most difficult aspect of starting the project is selecting the computer hardware and software that will form the "mail center." Consider the following:

1) Many mainframes and minicomputers operated by campus computer centers already have phone line access, electronic mail software, and access to one or more national networks (eg. ARPA Internet or NSFNet). This is a good way to experiment with a course. See Rogers (1989) for an example of this. There may be additional overhead for teaching students how to use the computer system.

2) There are many bulletin board software programs available. This is one way to offer electronic mail exchange on a budget. Most of these bulletin boards can't use network mail.

3) In-house development of a system offers the most flexibility at a greater cost. There are many considerations for hardware, software, and interconnection. This project almost certainly requires a project director who is familiar and comfortable with computer systems and terminology.

Summary

In conclusion, electronic transmission of correspondence material is a realistic addition to mail delivery. It removes the time delay barrier that discourages some students. Right now the audience is limited but this will not last long. There is a large base of current users of electronic mail and the numbers are increasing rapidly. With the introduction of networks serving more diversified audiences, like NSFNet (Catlett 1989, Reedy 1989), and the standardization of mail addressing, the diversity of the e-mail audience will increase.

Now is the time to start learning, thinking about, and developing these resources. Many of these networks are federally funded academic resources. Educators must have input into the development and "reserve their spot" on Worldnet.

Glossary

ARPANET	A national research network owned and operated by the Defense Advanced Research Projects Agency.

BITNET	(Because It's Time NETwork) A national cooperative network founded in 1981 by CUNY and Yale. This network originally developed around IBM mainframe computers and, in fact, was supported until 1986 by grants from IBM. Today, each site (university or company) pays an access fee. This network is supposed to be an open network for scholars. For-profit use is not permitted.
CSNET	A national computer science research network. This network was initially funded by the NSF in 1981.
Internet	A collection of interconnected networks. Often this is not transparent from the users. ARPA Internet, for example, is composed of ARPANET, MILNET and MINET.
Metanetwork	A collection of interconnected networks. CSNET is a example. It is composed of many smaller networks which are transparent to users.
NSFNet	A national research network originally designed to serve as a backbone to provide researchers access to CRAY supercomputers. See Catlett (1989) and Reddy (1989).
TCP-IP	This stands for Transmission Control Protocol - Internet Protocol. The term is thrown around by computer types. It is a standard protocol for networks.
UUCP	(Unix to Unix CoPy) This is the original mail-hop network. Until recently it worked well as a complete anarchy, only software was shared. The network is largely self-funded. Each site pays their own phone bill. A message hops from one computer to another along a path specified by the sender. UUCP is still very active.
USENET news	This is an international electronic conferencing system usually associated with UUCP. Messages are read and posted to interest groups. Like UUCP, USENET has traditionally been an anarchy and free (except for the phone bills).
X.25	A network communications protocol especially popular in Europe.

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Bridging the Gap: Building a Sense of Community for Graduate Students at a Distance

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This paper will describe the application of Wlodkowski's Time Continuum Model of Motivation to the design of graduate courses in occupational therapy that are offered via two-way interactive audio teleconferencing to students in the southeastern United States and Atlantic Canada.

Background

Limited access to graduate programs in occupational therapy is a reality for therapists who live and work away from major educational institutions. Two years ago a collaborative venture was implemented between the schools of occupational therapy at the Medical University of South Carolina (USA) and Dalhousie University (CANADA). Following a needs assessment, an initial pilot project was designed to adapt an existing, introductory graduate course from the Medical University of South Carolina and offer it concurrently to therapists in both countries. Success and continued interest have led to offering more graduate courses. The uniqueness of this arrangement has promoted interest in graduate education from therapists who traditionally would not have pursued advanced study.

Method

Wlodkowski's Time Continuum Model of Motivation draws upon the work of many motivational theorists and organizes itself around six major factors - attitude, need, stimulation, affect, competence, and reinforcement - which are applied during three critical periods in the learning sequence: beginning, during, and ending. It is the timely application of motivational strategies at these key points that maximizes motivation for adult learners.

BEGINNING

At the beginning of the learning sequence attention was given to the attitudes and needs of the learners. These two factors were particularly important during the pilot project as they set the emotional climate for the course, the on-site group (USA) and the distance learners (CANADA).

Attitudes

The regularly enrolled graduate occupational therapy students at the Medical University of South Carolina were asked to participate in the pilot project. Meanwhile, initial contact and mailing were conducted in Atlantic Canada using novelty as the major motivational strategy. Those students who chose to take the course, Overview of Theoretical Models in Occupational Therapy, were enrolled as special off-campus, or visiting, students and received transferrable graduate credit from the Medical University of South Carolina. The content of the course was particularly appropriate for therapists who had been in practice for several years, as it provided an exploration of the current body of theoretical knowledge for the profession of occupational therapy.

It was evident that the unusual mixture of students did influence the attitudinal make up of the total group as there were differences between the on-site and distance students as they related to the use of the audio teleconferences. Novelty and opportunity were stronger motivators for the distance students than they were for the on-site students.

Needs

The course was organized so that the on-site students in South Carolina maintained a traditional 15 week semester format in which eight audio teleconference sessions were held with the distance students. This format gave support to the on-site students as it honored their existing class schedule and access to the instructor.

Concern for learners at a distance led to the inclusion of an on-site visit at Dalhousie University from the instructor at the beginning and the middle of the semester. Although this meant travel and duplicate instruction for the instructor, the opportunity for face-to-face contact was considered essential for building group cohesiveness among the distance learners. The first on-site visit included learning style assessment, introductory course content, library orientation, and teleconference practice. Further support was provided by a common text and an author-developed learning guide which included one module of instruction for each of the seven course objectives. Structured learning activities were designed for face-to-face classroom sessions, audio teleconference sessions, and independent learning. Many of the learning activities included preselected readings so that students at a distance did not have difficulty obtaining them for lack of adequate library support.

DURING

Once the course was in session attention was given to stimulation and affect. These two factors were important as they set the tempo for the course and the audio teleconference sessions. Each audio teleconference session ran for approximately one and a half hours and linked students from six different distance sites in Atlantic Canada with the on-site group and instructor in South Carolina.

Stimulation

Stimulus variation was evident in the distribution of face-to-face instruction, audio teleconferences, and independent learning assignments. The teleconferences were particularly challenging and successfully orchestrated with the predesigned learning activities. Some distance students had previous experience with the technology and their skills contributed to the distance interactions. All distance students contributed well during the audio teleconferences ; however, the on-site students felt more inhibited using the equipment.

Affect

The emotional climate was promoted by the instructor and a group of experienced therapists as students, all with good skills in group process and interpersonal communication. The mid-term visit to Dalhousie University and a corresponding session in South Carolina, allowed small groups to present to their peers. The small group assignment fostered collaboration among the students and positive regard from their peers. Such respect for peer contributions is an important facet of graduate education. Unfortunately, it was not possible to arrange for the on-site students to present to the distance students or vice versa. Another advantage of the mid-term visit to Dalhousie was the opportunity for the instructor to hold office hours and meet individually with the distance students. Corresponding office hours were held for the on-site students. Availability of the instructor outside the class was a useful motivational strategy for supporting the emotive component of the course.

ENDING

At the end of the course attention was given to competence and reinforcement for the learners. These two factors were important in bringing closure to the course.

Competence

The major individual assignment for the course was a term paper that required the students to use an established set of guidelines and develop their own frame of reference for an area of occupational therapy practice. This paper involved the application of the course content to an area of student interest and relevance. Such choice allowed students to demonstrate competence in their area of expertise and generated much in the way of divergent thinking. Given the diversity of practice in occupational therapy, this was an important motivator for the adult learner.

Reinforcement

A structured grading sheet was used to give students feedback on their papers. A criterion-referenced approach to evaluation was used to reinforce individual achievement rather than comparative worth. In at least six cases, the instructor recommended that students consider presenting their work to other groups of occupational therapists, which they did at a subsequent regional conference.

Results

Course evaluation and external review demonstrated overall effectiveness, which was certainly due in part to the application of Wlodkowski's model. The application of the model was rather straight forward in the planning stages, helped to alleviate instructor concern for the first distance adventure with audio teleconferencing, and provided structure for students in both countries. Subsequent analysis of the course has reinforced the usefulness of the time continuum approach for sustaining effort and motivation throughout the semester.

The advantages of two-way interaction via the audio teleconferences and the supplemental face-to-face experiences played a major role in building a sense of connectedness among the learners in both countries. As these experiences were organized over time, they reinforced one another effectively. Students in both countries deserve credit for their willingness to participate in the pilot project.

Progress to Date

Requests to continue after the pilot project were accepted and five distance sites were added in the States for students who lived away from the Medical University of South Carolina. In subsequent courses it has been possible to vary some of the strategies. A popular format for distance students is to eliminate the beginning and mid-term visits and replace them with an on-site experience at the end of the course to share and present their work to their peers. Videotaping these presentations to send to students in the other country has not been as stimulating as the live on-site presentations. Another strategy has been to schedule student presentations during the audio teleconferences so that students in both countries can enjoy the contributions.

Conclusion

The opportunity for distance education in graduate occupational therapy programs in the United States is still in its infancy and certainly exploratory in nature at the Medical University of South Carolina. Experience, thus far, is a good example of using technology, course materials, and faculty in a way that benefits all parties; especially at a time when the demand for learning is high and the resources are few. The use of an established model of motivation is highly recommended as a guide for course design. Its structure provides a focus for the instructor and a safety net for instructional boredom.

The International Business Negotiation Simulations

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CIDE
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The International Business Negotiation Simulations, developed jointly by The University of Maryland University College and The University of Maryland College Park, consist of 3 1/2 day workshops, each of which uses a computer-managed, text-based teleconferencing-based simulation to teach business executives how to negotiate successfully in a specific cross-cultural business environment. The workshops allow participants to: 1) understand the general principles and practices of negotiation; 2) understand the challenges of cross-cultural negotiation in East Asia and develop techniques for meeting them; and 3) understand how to conduct business negotiations with Japanese or Korean executives.

Each workshop is built around a country-specific simulation which allows U.S. business executives, acting as members of a mock U.S. company, to perform a negotiation a specific business venture with their peers from a chosen foreign country. At present, two simulations focusing on East Asia have been successfully developed and piloted -- one based on Korea and one based on Japan.

Task Analysis

Before developing the simulation, the project team conducted a thorough analysis of both generic and cross-cultural negotiation processes. Based on both available literature and the advice of several subject matter experts, a four-stage procedural model of the negotiation process was developed consisting of the following stages (Figure 1): 1) selecting and contacting potential foreign partners; 2) preparing for negotiations; 3) conducting face-to-face negotiation meetings; and 4) creating the final agreement. Each stage was subdivided into steps small enough to allow for a knowledge analysis -- a determination of what prerequisite skills and information are required for each step.

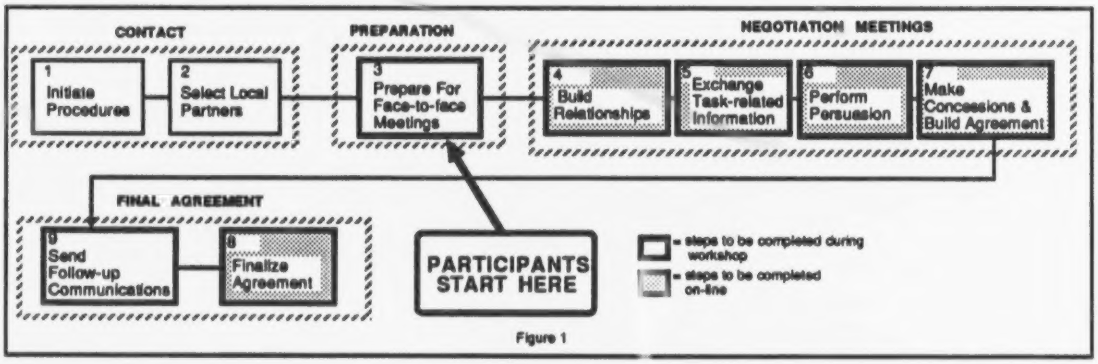
CONTACT
1 Initiate Procedures
2 Select Local Partners
PREPARATION
3 Prepare For Face-to-face Meetings
NEGOTIATION MEETINGS
4 Build Relationships
5 Exchange Task-related Information
6 Perform Persuasion
7 Make Concessions & Build Agreement
FINAL AGREEMENT
9 Send Follow-up Communications
8 Finalize Agreement
PARTICIPANTS START HERE
= steps to be completed during workshop
= steps to be completed on-line

Figure 1

This level of task analysis soon revealed the complexity of the negotiation process. For example, the two seemingly simple steps of stage 1 typically contain 10 substeps, each of which requires both specific information and the skill to properly interpret that information. Similarly, the single step of stage 2 (preparation) consists of at least 7 substeps. Since this complexity made it impossible to adequately address all content areas within the 5 days or less allowed in a typical workshop, we decided to focus the workshop on negotiation sessions. Participants "enter" the simulation at the preparation stage, after most critical information has been collected, and, most importantly, after negotiations with a potential foreign business partner have already been arranged.

Design of Workshop Modules

Designed to deal with stages two through four of the cross-cultural negotiations process, the workshop consists of four nested modules (Figure 2), each of which may be altered without affecting the others. This arrangement has facilitated both the development of new country-specific scenarios and the revision of existing modules.

The broadest module provides instruction in "generic" cross cultural business negotiations -- concepts, principles and procedures that apply to any negotiations in any cultural environment. Within this content area is an "area-specific" module consisting of instruction in the specific culture(s) for which the simulation is developed (e.g. East Asia). This module can be modified to focus on other cultures (e.g. Europe or Latin America) without affecting the the broader negotiation module. Similarly, a module providing instruction about each specific foreign country (e.g. Korea or Japan) does not alter the content of the broader modules. The most specific module is the simulation scenario which specifies the key elements and goals of the simulated negotiation.

Workshop Structure

Consistent with the nested modules, the workshop is built around three "on-line" negotiation sessions during which workshop participants in both countries try to reach an agreement on the nature of the proposed joint venture. Linked to each on-line session is a preparation session during which each team develops its strategy and tactics, and a debriefing session during which instructors help each team evaluate their performance. The rest of the workshop consists of instructional sessions. This structure requires that a workshop take no less than 3 1/2 days -- the minimum time to allow for realistic, comprehensive negotiations.

Target Population

The workshop was originally designed for mid to upper level managers of small to medium-sized businesses, although the workshop has been successfully piloted with participants from large corporations as well. Such participants generally have a solid understanding of business practices and often have some experience in negotiation. However, a population analysis revealed that few managers at any level have learned or developed any systematic approach to either domestic or cross-cultural negotiations.

Scenario

Developing the scenario involved working with subject matter experts to both determine and specify the key subset of critical characteristics of a cross-cultural business negotiation. These include business sector, companies involved in the negotiation, type of agreement sought, and political issues (either within a country or within a company) that may affect negotiations. The current scenarios specify a U.S. software company which seeks a joint venture agreement with an overseas EDP firm or computer manufacturer to develop and market software overseas. A joint venture was chosen over direct investment, trade, or contract agreements because it guarantees an appropriate richness and complexity of the simulation. The current emphasis on the U.S. trade deficit and on technology transfer issues led to the selection of the software sector and the focus on the overseas market. Intracompany politics influence negotiations in both the Japan and the Korea scenarios.

Documentation

A knowledge analysis of stages 1 and 2 of the negotiation model (Figure 1) indicated that participants would be able to master only a limited subset of the information that normally contributes to a cross-cultural business negotiation. This simplified subset includes the following: 1) structure, products and finances of the U.S. and the overseas companies; 2) background information on the foreign country; 3) preliminary intercompany correspondence; 4) a description of each negotiation team structure and its members; 5) product information (e.g..software product release); and 6) intracompany "marching orders."

This information is provided in a realistic format. For example, company information regarding finances, products, and organization is provided in the form of annual reports. Similarly, confidential "marching orders" are contained in company memos which are dated to indicate the timeline indicative of the pre-negotiation stages. These materials maximize participants' ability to effectively prepare for the on-line sessions that are the core of the simulated negotiation.

Telecommunications Interface

The on-line negotiation sessions are conducted via Polnet II, a real-time, text-based, computer-managed teleconferencing system. Unlike E-mail systems such as Bitnet, Polnet II sends messages immediately to the recipients. As soon as a team sends a message, it appears on the recipient's computer screen. This real-time feature facilitates a conversational flow of messages during negotiations.

Polnet II's support of multiple nodes allows the simulation "monitor" to unobtrusively examine all messages. Since the monitor can also send messages to each team, the monitor can intervene to keep the simulation on track without detracting from its realism. Separate nodes, located away from the negotiation teams, may also be provided for each company's headquarters which can be staffed by either instructors of designated participants.

Polnet II also allows for the fast retrieval of any previously sent messages. Such messages can be used to evaluate the progress of the simulated negotiation, to focus the debriefing sessions, and to compare different simulations of the same scenario.

Although text messages make it difficult to perform the relationship-building essential for negotiations with East Asians, a speakerphone allows teams to engage in informal discussions -- the close equivalent of what might occur away from the negotiation table. Speakerphones are also useful for the overall workshop debriefing during which participants generally reveal their real names and affiliations, and discuss their reactions to the simulation.

Teleconferencing Equipment

The Polnet II system runs on a DEC Microvax or an IBM AT located at The University of Maryland College Park. Each node or link on the system requires any PC that will run a basic telecommunications program, a modem (1200 baud or higher recommended), a printer, and a phone line to access an overseas satellite link via Telenet (provided by the university). The printer allows teams to maintain and review the record of the negotiation. This minimal configuration maximizes the system's adaptability to widely varying overseas environments. Although speakerphones are useful, they are not necessary to run the simulation.

Teleconferencing Protocols

To compensate for the differences between text-based and face-to-face communication, participants are asked to observe the following protocols: 1) if a response to a message is not immediate, send a brief acknowledgement of receipt; 2) keep most messages to no more than five lines; 3) do not waste time correcting typographical errors; 4) designate one team member to arbitrate deadlocks over wording; 5) use standard wordprocessors to create long messages (such as formal greetings, suggested agendas, or a memorandum of understanding) during the off-line preparation sessions -- these can be uploaded to the Polnet II system prior to or during the on-line sessions.

Team Structure and Roles

A typical negotiation team consists of four to seven participants, each of whom is assigned a role in the company that they represent. In addition to providing a protective anonymity, each role also encourages participants to bring a particular focus to the simulation. For example, the General Manager of Technical Support for U.S. Software would be expected to pay more attention to product issues than would the Vice President Marketing.

Participants are also asked to take functional roles that control the interaction with Polnet II. These roles are adapted from real-world negotiation teams. For example, a team spokesperson determines the final wording of each text message; a listener-observer is responsible for the printout -- the record of the negotiations; and an informal liaison is designated to pursue informal talks that are not part of the official record.

Time Constraints

Several constraints have affected the structure and duration of the workshop: 1) nature of the communications link; 2)time differences at overseas sites; and 3) availability of managers. The flow of messages over Polnet II makes it inadvisable to allow less than nine hours of on-line sessions. Also, the thirteen to fourteen hour time differences between the eastern U.S. and East Asia sites requires that such sessions begin no earlier than 7:00 P.M. EST. -- 9:00 A.M. in Japan. Problems of commuting in Japan (and in Seoul, Korea) make it difficult to begin such sessions earlier. In addition, most managers in the target population express reluctance to be out of the office for a full week.

Findings and Future Directions

Several pilots have verified that the workshop design and structure are sound. Although participants in the pilot workshop initially expressed doubts that they would require three negotiation sessions, by the end of the second session they were asking for more time. Despite this, all teams managed to reach their goal, the creation of a joint venture agreement, indicating that time pressures were not insurmountable. The addition of a brief practice session on Polnet II without the use of the overseas link, now allows participants to become familiar with the communication interface before they begin the simulated negotiations.

Future activities include the enhancement of workshop materials and the development of new scenarios. Based on the validated workshop structure, we are exploring the development of scenarios for a variety of areas including China (the petrochemical sector) and the Soviet Union (the automotive industry). Also under development is a comprehensive instructor's guide which may allow overseas sites (and other U.S. sites) to offer the workshop with more limited assistance from project personnel.

INSTRUCTIONAL STRATEGIES, DISTANCE EDUCATION AND STUDENT INVOLVEMENT

Presenters

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Introduction

In this era of remarkable change, educational institutions must teach more than facts and information. Students must learn how to access the information they need; they must learn to make judgements about the quality of that information; they must learn to work together to solve problems; and they must learn to evaluate their actions. In contrast, higher education practice focuses upon the learning of facts and information. Although the lecture is but one of many possible instructional methods, its use dominates the classroom. An efficient method for learning how to memorize and recall information, the lecture is a poor choice when the learning objectives require problem solving and evaluation skills. As Astin (1984) so poignantly stated, students learn not by attending lectures and taking notes, they learn by becoming involved with the material to be learned. The teaching strategies which encourage only passive attention to the content must no longer continue to dominate popular practice in an era in which the obsolescence of information is outpaced only by the creation of new information.

The nature of student involvement in the learning process is especially pertinent to the practice of distance education, for involvement is all too often only an elusive opportunity for the student separated by physical distance. However, much of the current attention within distance education practice is focused upon broadcast and satellite technology, largely passive media which foster little involvement. (Jayaweera 1985; Casey-Stahmer and Goldschmidt 1985 as cited in Moore, 1988).

This study examines student involvement through an analysis of the strategies used by faculty who teach distance students using an instructional television system. The purpose of this study is to determine who participates in distance teaching and why; what instructional strategies the faculty choose and the nature of the selection process; and finally if any differences exist between the strategies used by the faculty in the televised classes and the equivalent on-campus class.

Methodology

Data was gathered using surveys and focused telephone interviews. Surveys were mailed to 161 television faculty during the 1985-86 academic year, and 88 were returned, a response rate of 56 percent. A follow-up survey administered again during the Fall 1987 semester received a response rate of 42 percent, with 25 of the 59 faculty responding. Since the researchers promised anonymity, no attempt was made to avoid duplication of respondents participating in the second survey.

The survey consisted of three sections. The first requested general information from each professor including institution, discipline, degree and nature of the distance teaching assignment. The second requested information about the course taught on television and included questions about the teaching strategies and methods utilized by the professor. The final portion of the survey consisted of open response items assessing the professor's attitudes toward the television teaching experience. Faculty who had previously taught on the television

*This research was supported by the Oklahoma Research Center for Continuing Professional and Higher Education, College Education, University of Oklahoma.

system field tested the survey, but were not included in the population. The follow-up questionnaire compared strategies and methods used in the television classes with those used in the identical traditional class.

Structured telephone interviews were conducted with 17 of the 84 faculty (20 percent) teaching on the television system during the Spring 1989 semester to provide insights into the process faculty used to select strategies for both the traditional and television courses. The faculty interviewed were selected using a stratified random sample to ensure representation from all participating schools and subject areas.

The analysis of the surveys was primarily descriptive, using means, standard deviations and frequency distributions. Analysis of the differences between the strategies used in the television and traditional classes used T-tests and Chi Square. Analysis of the open response items and focused interviews utilized content analysis techniques.

Results

Faculty Characteristics

Forty-four percent of the respondent group were members of traditional Arts and Science disciplines (humanities, natural sciences, social sciences), while fifty-four percent represented the professional fields of business, engineering, education and law. Sixty-three percent held the doctorate, and they represent a veteran group of faculty, with an average of 14.5 years at their present institution. Ninety-three percent taught the television course on an in-load basis and 51 percent taught the course because it was assigned to them, while 45 percent volunteered. Thirty-three percent of the reported courses were lower division, 38 upper division and 24 were graduate. Forty percent of the faculty reported receiving some training on the system, compared to 60 percent who received none.

Instructional Practices and Strategies

The second set of responses requested information about the courses, specifically related to the type of instructional strategies and practices utilized. Instructional practices included such information as instructor visits to distant sites and required "out-of-class" assignments including research papers, library activities and field experiences; instructional strategies included "in class" activities. The framework developed by Weston and Cranton (1986) provided the basis for the analysis of instructional strategies.

Thirty-six percent of the faculty visited the distant sites, while 64 percent reported no visits. Regarding "out-of-class" activities, 54 percent required the use of reference materials, 49 percent required library materials, 34 percent required research papers, 14 percent required field experiences. Library access is important to the distance students since over one-half (55 percent) of the faculty required some type of library work. Of the twenty-five faculty responding to the follow-up survey, 26 percent said that they would have required these activities had the class not been a television class, 30 percent would have required the same activities regardless of the delivery system utilized, and 43 percent made no response to this item.

The analysis of instructional strategies utilized by the faculty respondents provides further insight into the nature of student involvement activities. Weston and Cranton (1986) classified thirteen teaching strategies into the following four categories. The instructor-centered strategies include lecture, questioning, and demonstration. These are efficient methods for learning within the knowledge and comprehension levels of the cognitive domain and the receiving level of the affective domain. The interactive strategies include class discussion, discussion groups, group projects, and peer teaching. Because these methods utilize communication among students and between students and teacher, these strategies are effective for learning within the upper levels of the cognitive domain including analysis, synthesis, and evaluation and for learning within all levels of the affective domain. The individualized learning strategies are "based on the assumption that students learn at different speeds and that regular and immediate feedback facilitates learning" (p. 262). These strategies can be adapted to accommodate all levels of learning and can be instructor-centered, interactive or experiential. Although programmed and modularized instruction are generally individualized, computerized instruction can accommodate of group interactions using computer conferencing techniques. Finally, the experiential strategies provide the student with the opportunity to perform in a real or simulated setting and include laboratory methods, role playing, simulations, games, and drill and practice. Experiential strategies, too, can be described in each of the above categories, and therefore can support learning at all levels of the cognitive, affective and psychomotor domain. However, these methods are less efficient for learning at the lower levels of the cognitive and affective domains, but particularly effective for learning within the higher levels of the cognitive and affective domains (Weston and Cranton, 1986).

Faculty were asked to identify which teaching strategies they used on a scale from one to five, with response categories ranging from "used most often" (5) to "used" (1), with an option also for "unknown" (0). Since faculty often taught more than one course on the system and could use different strategies in different courses, the data was tabulated by course rather than by instructor. As expected, the instructor-centered strategies were used most frequently, with a mean of 3.47. The interactive, individualized and experiential strategies were used considerably less, with means of 1.76, 1.59 and 1.36 respectively. The strategies used most often include lecture, with a mean of 4.46, directed questioning, with a mean of 3.3, discussion, with a mean of 3.16, and demonstration, with a mean of 2.66. The strategies used least include laboratory with a mean of 1.16, role playing with a mean of 1.27, discussion group with a mean of 1.28, and peer teaching with a mean of 1.29.

Lecture was used most often in two-thirds (66.7 percent) of the courses taught on the distance teaching system. Likewise, in over two-thirds of the courses, faculty reported using only instructor-centered strategies: lecture, directed questioning and discussion, indicating that the remaining nine strategies were either unknown or never used.

Since faculty often teach the same course in both the distant and traditional on-campus modes, the second survey compared the strategies used in these two teaching modes. When teaching in the traditional on-campus mode, the faculty reported using the interactive strategies significantly more than when teaching on the television system ($t=.0085$). Similar tests showed no significant differences between the television and traditional classes in the use of teacher-centered, interactive and experiential strategies. Collapsing the one to five scale into strategies used less (representing 1, 2 and 3 on the five point scale) and strategies used more (representing 4 and 5 on the five point scale) allowed a Chi Square analysis to determine if differences existed between the strategies used in the television and traditional on-campus modes. Significant differences were found in the use of discussion group ($X=.016$), group projects ($X=.01$), and laboratory strategies ($X=.008$), as faculty reported using these in the traditional on-campus class, but not in the television class.

Focused Interviews

Seventeen faculty participated in telephone interviews during which they were asked to discuss their television courses. The interviews were designed to provide insight into the rationale used to select instructional strategies and the impact of the technology and training upon the selection process. Only one of the seventeen faculty interviewed did not rely primarily upon lecture. However, five of the respondents indicated that this was not the best method, but selected lecture because the medium prohibited the use of other methods. Many of the faculty would opt for group methods, but cited difficulty in getting participation from the distant students, either as a result of technical problems relating to the audio system or because of a greater hesitancy on the part of the remote students to participate. Other barriers included courier delays which exacerbated the difficulties associated with the use of problem analysis and case studies, the advanced preparation time required to get related materials to the students, and poor coordination at the receiving sites. Three of the respondents cited a general resistance among faculty regarding the use of any strategy other than the lecture. Thirteen of the respondents used the same strategies in the equivalent on-campus course. Differences were generally a matter of degree, especially regarding the use of questioning and group discussion strategies. The faculty still used these strategies in the television class, but used them less often. Student demonstrations are not used because the on-campus class cannot see the remote class. Two of the respondents who use computer instruction in the on-campus class were not able to do so in the television class because computer equipment is unavailable at the distant sites. Likewise, faculty at several institutions could not use films or video tapes in the television class, because their institutions did not provide that service or because of copyright prohibitions related to nonsimultaneous secondary transmission.

In response to the questions regarding funding priorities, the faculty most often cited technical resources, including improved audio transmission, two-way video, color capability (some classrooms are color-equipped, others are not), the addition of facsimile service, better camera operators, and finally computer communications. Nontechnical priorities included improved library and courier services, better control at the distant sites, course development support, and more financial incentives for participating faculty.

Only the minority of the faculty interviewed reported receiving any training regarding the use of the television system. Two of these sought help from another experienced faculty member. All who received training reported that the content of the training covered only the operational and administrative aspects of the system (how to use the studio, sending materials, etc). None received any training relative to instruction, course design or reaching the distant learner, although one respondent received a handbook which addressed effective television teaching.

Summary

The faculty who teach the distant learner using the Oklahoma Televised Instruction System rely primarily upon instructor-centered strategies, particularly the lecture, thus supporting learning within the knowledge and comprehension levels of the cognitive domain. Participation in the distant teaching system does not appear to affect the selection of teaching strategies and practices as most faculty utilize the same methods in the identical on-campus class. The single exception was the minority of faculty who use discussion groups, laboratory methods, and group projects in the on-campus class do not tend to use these in the equivalent television class. Interviews with the faculty regarding the process they used for selecting instructional strategies suggest that the selection process is based upon some attention to the type of learning required by the content, rather than merely habit. However, the selection process does not include an analysis of the type of instructional objectives and most faculty seem to have only a small repertoire of instructional strategies from which to choose. The faculty identified the technology as the primary barrier to the use of non-instructor centered strategies.

Although most of the faculty who teach the television classes are veteran faculty, most would not choose to participate if given a choice. Participating institutions provide few rewards for faculty who use television to reach distance students. Likewise, the institutions provide only minimal training for the faculty. The training which is available is primarily operational with little attention given to course design, instruction and meeting the unique needs of the distant learner. It is of interest that many faculty cited the student camera operator as a "gatekeeper" who can either inhibit or expand the opportunities available to the faculty using the television system.

However, despite all the problems cited, the faculty perceive the Televised Instruction System to be a valuable tool for reaching the distant learner.

Conclusions

Promoting student involvement in learning is critical if we are to educate a society capable of meeting the demands of the information age. The unique characteristics of distance education require a greater emphasis on involvement strategies and methods than traditional on-campus instruction. Rather than continuing to be enamored with the effectiveness of a particular technology in reaching the distant student, practitioners should instead focus upon the nature of the student's involvement in the teaching-learning process. Continued reliance upon the teacher-centered strategies places too much attention upon what the teacher does, and too little attention upon what the student does.

Future research in the design of instruction for distance education need no longer continue to focus upon the media, but should rather attend to the method. Research should attempt to provide distance education practitioners with more systematic guidelines for selecting instructional strategies; guidelines which are linked to the types of learning demanded by the requirements of the new learning society.

Finally, distance education activities must be incorporated into the mainstream of institutional practice through faculty development initiatives. Faculty development efforts must address both faculty training and more importantly, the institutional rewards for participation in the increasingly critical task of providing educational opportunities to the learner who is prevented from access to education due to geographic distance.

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Self-Directed Learning Readiness in Distance Education

Janice Harring-Hendon

ABSTRACT

Participation in an external degree program requires a learner to accept a great deal of responsibility for learning and involves the learner most deeply in the self-directed learning process. The purpose of this study was to determine how well prepared students in an external degree program are to engage in individualized, self-directed learning. The population of the research project was 51 students enrolled in the Extended Degree Program at the University of Wisconsin-Green Bay. The subjects were administered the Self-Directed Learning Readiness Scale, developed by Lucy Guglielmino (1977), and a second short survey instrument. Findings indicated that 72 percent of the subjects scored above average in readiness for self directed learning. Data collected from the survey form identified inadequacies with respect to self-directed learning efforts and indicated assistance learners felt they needed for improving the learning experience in the external degree program. The results of the study suggest assessing self-directed learning readiness, fostering self-directed learning, and exploring relationships between student persistence and performance by providers of distance education.

Introduction

Extended degree programs offer great flexibility for students, yet are academically demanding. In order to succeed, an individual generally should have well-defined goals, be highly motivated and possess good learning skills. A basic concept associated with these programs suggests that the learner has a great deal of responsibility for his/her learning. The majority of learning in an external degree program is done independently and a great deal of motivation, independence and determination is required in order to complete this type of program.

Malcolm Knowles (1975) has noted, "External degree programs, nontraditional study programs... put a heavy responsibility on the learner to take a good deal of initiative in their own learning" (p.15). Learning in an external degree program is an exercise in independence in which the participant is involved with the planning, timing, and carrying out of individual study.

Distance education programs providing individualized learning combined with weekend seminars, study guides, mediated instruction, and learning contracts have important implications for adult students and providers of distance education. Most significantly, they involve the learner deeply in independent or self-directed learning.

At the present time, little information exists to determine how well prepared participants in external degree programs are to meet the demands of independent learning in distance education programs. This study focussed on assessing self-directed learning readiness of participants in an external degree program and problems associated with this mode of learning; thus providing recommendations for practice and research.

Research Questions

The following research questions guided this study:

1. How well prepared are students enrolled in an external degree program to engage in individualized, self-directed learning?
2. What problems are learners in an external degree program encountering?
3. What might be done to improve the participants' effectiveness in learning?

Methodology

The population for the study was adult students enrolled in the Extended Degree Program at the University of Wisconsin-Green Bay. The Self-Directed Learning Readiness Scale, developed by Lucy Guglielmino (1977), was administered along with a short survey form.

The questionnaires were administered to 51 Extended Degree students. The SDLRS is a 58-item Likert scale designed to assess the degree to which individuals perceive themselves to possess skills and attitudes frequently associated with self-directed learning and is recommended as having power to identify self-direction in learning behavior. The short survey form was utilized: a) to collect demographic data such as sex, age, and educational background; b) to determine obstacles experienced in independent, self-directed learning; and c) to identify assistance learners needed to improve their learning in an external degree program. Data were analyzed using descriptive research techniques.

Findings

Approximately 76 percent of the participants were female with 78 percent of the individuals between the ages of 25 and 45. The average age of the respondents was 39. Approximately 72 percent of the participants scored above average on the self-directed learning readiness scale. These scores are displayed in Table A. Problems experienced by distance learners were identified by 98 percent of the students surveyed. The problems identified by the participants are displayed in Table B.

Table A
Self-Directed learning Readiness Scores

Score	Ranking	N	%
252-290	High	18	35
227-251	Above Average	19	37
202-226	Average	13	25
177-201	Below Average	1	2
58-176	Low	0	0

Table B
Problems experienced by students in an external degree program

	N	%
Dealing with time constraints	33	65
Deciding when to study	27	53
Sustaining motivation for dealing with motivational blocks	21	41
Dealing with exam anxiety	18	35
Utilizing library facilities	19	37
Communicating to professors when help is needed	19	37
Meeting course goals and objectives by course deadlines	17	33
Asking questions to improve understanding of material	12	24
Deciding the most effective place to study	11	22
Reading for meaning	11	22
Learning effectively on my own	7	14
Deciding on learning priorities	6	12
Taking notes from classroom lectures	3	6
Listening effectively	2	3

Approximately 65 percent of the respondents indicated and identified assistance that would be helpful in improving their learning experience in the Extended Degree Program. The dominant categories which emerged from the responses suggesting assistance that would improve learning included the following: a) increased use of media; b) increased student interaction; c) assistance with study skills development i.e.,note- taking, writing research papers, taking exams; d) assistance with communication with professors; e) overcoming anxiety and motivational blocks.

Conclusions

Findings from this study provided evidence to support that, although participants in the Extended Degree Program possessed high levels of readiness for self-directed learning, they are not completely comfortable with the self-directed learning process as evidenced by problems they experienced and assistance needed. A message of inadequacy from participants in this study verified factors which precipitate barriers with learning in an external degree program.

Implications

Chere Campbell-Coggins (1988) suggests that "external degree programs should emphasize survival skills and learning how to learn at a distance" (p 34). The demands of learning at a distance require solid exercise in independent, self-directed learning and should certainly be considered an essential survival skill in distance education programs. Mezirow (1985) has noted that individuals vary in their readiness for self-direction and it is important for facilitators of adult learning to understand that they may have to assist some learners to become more self-directed.

Instructors teaching learners at a distance are faced with the challenge involving learners in self-directed study. Brockett (1985) suggests a move toward increased self-directedness implies a changed role for the instructor. The successful teacher in self-directed learning situations must utilize facilitation techniques and serve as a manager in the teaching-learning transaction.

Promoting self-directed learning skills includes development of a wide variety of learning techniques and supportive instructional devices to maintain learner interest and stimulate learner motivation. Robert Smith (1983) suggests, "For success in self-directed learning one needs planning skills for deciding what, when, how, and where to learn; for setting realistic goals, for finding learning resources and choosing and implementing learning strategies" (p. 22). Instructors can greatly enhance the development of self-directed learning skills by attempting to make a high level of self-direction an important part of the learning process in distance education.

In order to better understand the role that self-directed learning plays in student performance and persistence in distance education, more in-depth studies are needed. Research commitments to identify and foster self-directed learning could provide assurance for student success and academic quality for distance education.

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INSTRUCTIONAL DESIGN CONSIDERATIONS IN THE DEVELOPMENT OF COMPUTER-ASSISTED INTERACTIVE VIDEO

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Introduction

Computer Assisted Interactive Video (CAIV) has been hailed as a medium that has great potential for distance education with its ability to maximize the opportunity for delivery of individualized, interactive instruction affording the learner significant control over the medium. The development of CAIV for education and training is still at an experimental stage. In most instructional designs for CAIV, the tendency has been to focus design on the technical attributes of the new medium rather than on principles derived from theories of learning and instruction for the systematic design of instruction.

Therefore, this paper attempts to discuss a framework for the design and development of CAIV that is based on theories of learning and instructional design focusing on techniques that can facilitate distance students' learning from CAIV instruction. The discussion draws on design principles derived from both behaviorist and cognitive learning theories especially recent research on information processing, and the design experience gained by the authors during their involvement as instructional designers in CAIV projects which used pre-produced videotapes. The design and development of CAIV will be discussed in terms of macro and micro level design considerations.

Macro Level Instructional Design and Development

Macro level instructional design and development considerations address a systematic total process of planning, implementing, and evaluating instruction and learning. It can involve four phases: needs assessment, design, development and implementation, and evaluation and revision. As can be seen in Figure 1, this last phase serves as a connecting point between phases (Hannafin & Peck, 1988).

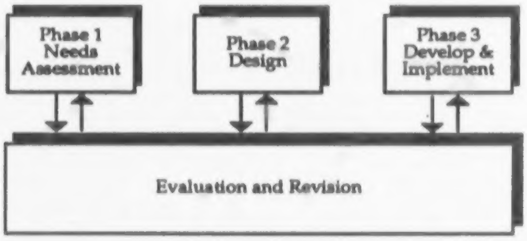

Figure 1

The Needs Assessment Phase

The purpose of the needs assessment phase is to define clearly the project specifications which include the identification of learner characteristics, the analysis of the learning environment, the identification of constraints and limitations, the development of goals, learning tasks, and objectives, and the development of evaluation items.

Identifying Learner Characteristics. When analyzing learner characteristics, not only demographic information such as gender, age, and socioeconomic status, but also academic background such as prior knowledge and experience toward the topic, and other issues such as motivation level, attitude toward technology, and learning style should be taken into consideration. For example, most often, distance learners are self-motivated adult students who are restricted by job and family responsibilities who feel the pressing need to continue their

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education and training. When selecting a highly individualized instruction system like CAIV however, it is important to determine whether the learners are comfortable with this mode of instruction and whether they have acquired "self-directed" learning strategies which would enable them to learn effectively from this medium of instruction.

Analyzing the Learning Environment. The learning environment is the setting and/or situation where the learning takes place. Unlike the traditional classrooms, the distance learning environment is unstructured and flexible in terms of sequencing and pacing of instruction; therefore, individual learning needs can be catered for much more than in a structured environment. Moreover, as Gunawardena (1988) suggests, since the learner and the teacher are geographically separated, it is important to provide a support system which includes communication between the learner and the teacher in writing or by telephone, as well as feedback from the instructor in writing or on audiocassettes, and printed support such as a study guide. This is also the stage to determine if an interactive program is the best means for the solution of the instructional problem. As Hannafin and Peck (1988) suggest, CAIV may not be the best alternative unless realistic images and motion are required to maintain attention and meet the instructional objectives. CAIV equipment should also be available for student use.

Identifying Constraints/Limitations. Constraints and limitations often include time limitations and resource constraints (human resources as well as material resources). This is the stage to determine what kind of equipment setup is used. For example, in one of our projects, since our facility was not equipped with a video disc player, our choice was to make a video on VHS format and program on APPLESOFT BASIC.

Determining Goals, Learning Tasks, and Objectives. Goals are general statements of what is to be accomplished, but usually too vague to guide the development of instruction. Goals serve as a basis for the instructional analysis. Instructional analysis can be conducted by describing the task (observable behaviors and cognitive processes), listing enabling skills and knowledge (by identifying subtasks), and differentiating between topics to be taught and those to be assumed. At this time, measurable and observable objectives can be developed by translating the instructional tasks. Measurable objectives should have behavior, condition, and criteria components.

Developing Evaluation Items. There are some advantages to writing the test items immediately after the objectives are developed. First, the instructional designer can make sure that the test items match the conditions and behavior specified in the objectives since the intentions of the objectives are fresh in the designer's mind. Secondly, if the designer finds it difficult or impossible to write a test item for the objective, he or she will know at this time that the objectives may need to be revised (Ragan, 1987).

Output to the Evaluation and Revision Phase. When needs assessment is completed, its findings are to be evaluated and revised in this phase. For example, when objectives are revised, it may be necessary to go back to re-analyze the instructional activities as well as the entry skills and knowledge for the target audience specified. After the necessary revision, attention can be shifted back to the design phase.

The Design Phase

The purpose of the design phase is to identify and document specifications for effective instruction. It can involve 1) determining the sequence of objectives, 2) describing activities and instructional strategies for each objective, and 3) flowcharting/storyboarding. Specific design considerations for CAIV are discussed later under micro level considerations.

Output to the Evaluation and Revision Phase. After the design phase, the attention is shifted again to the evaluation and revision phase in order to review and re-assess the activities from the first and second phases.

Development and Implementation Phase

For CAIV, activities in this phase include video production, equipment set-up, address code writing, tape logging, and program writing. If no pre-produced video is available, then the video should be produced.

Although regular rules apply to video production the following guidelines should be followed when making video for CAIV purposes:

- Audio should be recorded only on one channel because the other will be used later on for laying the address codes that are necessary for the computer to pick up the exact scenes. If the pre-made video program uses both channels, it is necessary at this time to dub it to another tape with the audio of both channels mixed into one channel.
- Video has to be recorded on the entire tape; blank spots on a tape are not readable by the computer which lays the address codes later on.
- It is not necessary to do a super editing job to have the scenes at the exact spot in certain sequence since the microcomputer only picks up the address codes for certain scenes. However, mini frames and frequently accessed frames should be recorded toward the center of the tape for easier access.

Equipment needed for developing CAIV include a microcomputer, a video cassette player, and the interface card that connects the microcomputer to the video unit. After making sure that all the equipment is connected in the proper fashion, the address code should be recorded on the tape. In logging the tape, the "in" and "out" points (address codes) for all the scenes as well as for all the subsets of those scenes that may be accessed as remedial frames should be established. It is important to log all the accessible scenes. At this time, the computer program is written following the flowchart made in the needs analysis phase and the design specification document developed in the design phase. It is recommended that the structured programming technique be used. In this way, program segments can be called in to the main program as needed in an organized fashion saving memory space and the retyping of the program segment. It is also easy to debug the program later on.

Output to the Evaluation and Revision Phase. There are two types of evaluation; one is the evaluation of the learners' performance and the other, the instructional program's performance. The learners' performance is evaluated by the test items developed in the first stage. The program's performance, however, needs to be tested in this phase. Formative evaluation can include content review, one-to-one evaluation, small group evaluation, and field trials. The big difference between formative evaluation and summative evaluation is that the former takes place when the program is being developed while the latter takes place after the development is completed.

Micro Level Instructional Design

Micro level design considerations address specific design factors that pertain to the design of CAIV lesson modules or sequences. These include a discussion of a) the design of "interactions" for a CAIV system and the adaptation of these interactions to suit learner characteristics, and b) the design of instructional events to facilitate internal learning processes.

The fundamental notion that underlies all of the design factors in CAIV is "interactivity." CAIV is inherently an interactive medium, a combination of computer-assisted instruction and video-based instruction, where the student interacts with the instruction delivered via a computer program which is capable of accessing video segments from a videotape or videodisc. The interactive potential of the computer in CAIV assures the rehearsal of video segments which is not possible if only video is used. (The basic CAIV program is composed of video segments that present information and remedial segments that the student will see only when he or she does not understand the material in the lesson segments.) The quality of interaction, that is, the dialogue between the learner and the instructional program, however, will depend largely on the design features of each individual program.

The Design of Interactions for a CAIV Program

Jonassen (1985) notes that "The effectiveness of an interactive design is a function not only of the type of student-technology response, but also of the action of the technology as a result of that interaction. So, in addition to the interaction of the learner with the instructional program, the promise of interactive learning programs is the promise of adaptation to the learner" (p. 3). According to Jonassen (1985) interactive technologies possess two dimensions, the interactive dimension and the adaptive dimension and each dimension adds a different set of capabilities to interactive programs. The interactive dimension describes the way in which learners interact with an instructional program and the adaptive dimension describes the way in which instructional programs may adapt to either the needs of the learner or to the content it is presenting.

From a design point of view, one of the most important features that enhances the quality of interaction in a CAIV program is nonlinear format of content or branching. Three other important features are learner control options, feedback which ensures remediation and practice.

Nonlinear format of content. In "nonlinear format of content" or branching programs, a student can directly interact with the content by choosing his or her own sequence and direction through the lesson according to his or her own needs. Branching options indicate the degree to which CAIV is individualized. Unlike linear designs in which all learners proceed through the same instruction in the same order, branching makes possible the review of previous lesson segments for slower learners, the skipping of already learned information by faster learners, the use of menus from which learners can select aspects of a lesson, and many other additional options related to the individual needs, preferences, or performance differences among students. " This type of nonlinear format of content promotes higher learning by allowing the content to be organized in the students' mind according to individual needs and his or her own internal logic-order of the subject matter" (Cohen, 1984, p. 17).

Learner control options. Learner control gives learners control or influence over instructional strategy elements and permits individual students to make various decisions about lesson activities and procedures based upon individually perceived needs. Learner controlled instruction may allow learners to choose which video segments are to be displayed, the sequence in which they are to be displayed, the number of examples presented, the number of practice questions they want to complete, etc. Researchers have shown that some of the benefits of learner control are: greater individualization, an increased sense of personal responsibility for learning, and the potential to optimize learning efficiency. Even though giving learners control over instruction is a mature approach to learning, especially in the case of adults, instructional designers need to be cautious in the implementation of learner control options. Jonassen (1985) argues that although learner control is a desirable option, that control will succeed only if learners are capable and willing to maintain their own comprehension.

Recent studies (cited in Hannafin, 1984) suggest that providing the option of learner control to older and more able learners may enable them to apply individually developed cognitive strategies to synthesize and assimilate information. On the other hand, for younger and less able learners, program or lesson control may provide a better organization of information to be acquired. Researchers have successfully developed procedures that offer guidance upon which individual learner's decisions can be based. Learners may be advised as to the number of practice items or examples recommended, based upon the individual learner's past, current, or cumulative performance, during a lesson. However, the learner maintains control over the instructional decisions by accepting or rejecting the advice offered during the lesson, and proceeding as individually deemed appropriate (Hannafin, 1984).

Feedback and remediation. Feedback is the message which follows the learner's response to a question and plays a very important role in the interactive dialogue between the student and the lesson material. Appropriately designed feedback messages should locate the error and inform the student why it is wrong and how to correct it. Cohen (1984) notes that "remediation is an extremely important feature which ensures that when the learner responds incorrectly to a question he or she will be branched to a remedial sequence whereby the information is reviewed using an alternate approach to the content." She observes that very often, after an incorrect response has been entered, a CAIV program will loop back to the same video sequence that was viewed initially. This technique, she notes, is not remediation but review. This approach is not as effective as branching to a remedial sequence which uses an alternate approach to the content.

Practice. Hannafin et al (1986) note that practice is a dominant influence in the instructional effectiveness of interactive video and quote recent studies that have demonstrated the power of embedded practice during CBI as well as during interactive video. However, the influence of practice for different types of learning is not uniform. For interactive video, practice may be more important for some types of learning than for others. In an empirical study, Hannafin et al (1986) found that the interaction between practice and type of learning is consistent with earlier interactive video research where practice effects were most important for the learning of factual information. Practice appears to yield the greatest benefits for verbal information in basic interactive video lesson designs. They note that unique lesson designs will likely be required if the potential for promoting high-level learning is to be realized.

The Design of Instructional Events to Facilitate Internal Learning Processes

Gagne et al (1984) describe nine events of instruction that designers of CAIV should use to support internal learning processes. The nine events can be related specifically to cognitive processes which are supported by the "information processing" view of learning. Instruction should be designed to a) gain the learner's attention, b) inform the learner of the lesson objective, c) stimulate recall of prior learning, d) present stimuli with distinctive features, e) guide learning, f) elicit performance, g) provide informative feedback, h) assess performance, and i) enhance retention and learning transfer. They observe that designers of CAI instruction need to attend to all nine of these events and that decisions to omit any of the nine events should be deliberate and rational and should not result from oversight.

Hannafin et al (1988) describe a meta-model ROPES based on psychological rather than technological theory and research that was developed specifically to guide the design of CAIV. ROPES of instruction refers to Retrieval, Orientation, Presentation, Encoding, and Sequence. Retrieval refers to the strategies that instructional designers should use to improve the retrievability of instructional content, such as cueing mechanisms and techniques for encoding information and relating instructional content to students' prior experience. Orienting activities prepare learners for instruction by retrieving relevant information from Long Term Memory (LTM) to be encoded with new information. In general, these strategies may be either explicit, such as behavioral objectives that help to acquaint the learner with a specific task, or implicit such as advance organizers that help the learner to build an internal framework for the learning task. Presentation refers to factors such as video and non-video techniques, color and image quality that instructional designers must use with care to ensure that learners process information adequately. Encoding strategies facilitate transfer into LTM based upon factors that affect the integration of new with existing information. Sequence deals with the type of "control" students are given over the lesson sequence.

The macro and micro design considerations discussed in this paper provide guidelines that instructional designers can follow in the development of CAIV instruction for distance learners.

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Designing a Teleclass Instructor's Workshop Addressing the Differential Skills Needed for Quality Teleclass Teaching

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With the proliferation of universities developing distance education courses, live and packaged, using primarily television as the major delivery vehicle, it is only natural that the issue of quality of these programs be addressed. A recent study conducted by Cyrs and Smith[1] indicates that of the major universities, (this does not include community colleges), currently using the telecourse format for distance education programs, very few have formal training programs that promote improved teaching for television. Those that say they do train for TV teaching address the issue with a two or three page handout with a few exceptions. In fact, we have found that most faculty are told that teaching in a teleclassroom environment is essentially the same as teaching in a traditional face to face classroom. This is an erroneous assumption. There are, indeed, skills needed for television teaching that are different than or more critical to the medium of instructional TV than traditional teaching. Teleclassroom teaching is defined as teaching via television live by means of any electronic delivery systems such as ITFS, microwave, fiber optic, or satellite using one or two way video and two way audio or in a packaged format using videotape with or without telephone or other electronic interaction. The latter is a self-contained program that is self-pacing and self-directing. These are sophisticated and expensive programs to develop. As universities begin to aggressively market their telecourses the mood will shift from cooperation to competition.

As the consumer has more choices for the same telecourse from several universities, the decision to purchase will be based on the overall quality of the telecourse, the relevance and timeliness of the subject matter and the quality of the teaching.

In order to improve the quality of telecourse teaching, eight (8) factors were identified which differentiated telecourse teaching from traditional teaching through a review of the literature, site visitations, personal interviews, and personal experience. These eight teaching factors will be validated this fall through the use of a Delphi study with university telecourse developers across the U.S.

The eight differentiating factor for teleclass teaching have been presented in detail in a faculty handbook by Cyrs and Smith (1988) which is accompanied by a one or two day workshop. These differentiating factors include:

1. Telecourse Organization

Telecourses must be organized in much greater detail with more pre-planning than traditional courses with emphasis in areas such as:

a. More structure within a defined time period.
b. More emphasis on personal appearance and oral presentation.

c. Use of a performance based teaching model for course evaluation.
d. Minimize note-copying behavior and focus on the instructor.
e. If the course is self-contained, use of a Student Reference Manual for directions.
f. A comprehensive and accurate course syllabus.
g. Organization of handouts.
h. Course administration for on-site delivery and retrieval of instructional materials.

2. Use of Visuals in TV Format
    a. Need on-camera practice.
    b. Relevance to oral delivery.
    c. Prepared in 3 X 4 aspect ratio.
    d. Possible copies to the student for relevance.
    e. If drawn on camera must be legible.
3. Oral Presentation Skills
    a. Articulate for in-class as well as field students.
    b. Speak to the camera as well as in-class students.
    c. Project enthusiasm through pitch, projection, and enunciation.
4. Looking Good on Television.
    a. This reflects the best presentation of an instructors personal physical and mental attributes and projects his/her TV personality.
    b. This is shown in the use of body language - eye contact, smiling and movement.
    c. Dress and accessories are very important.
    d. Ability to laugh at your own mistakes.
5. Use of Interactive Study Guides (ISG)
    a. The ISG is an organizational tool for the student which incorporates most of the essential notes and visual materials which the instructor will use on the TV screen. Each page of the ISG is broken down into numbered displays which contain a logical and manageable unit of information or graphics. Key concepts, rules or principles are left blank and the student is required to "fill in" the missing data. These displays which appear on the TV screen are continually referred to by number by the instructor for easy reference. In addition to "fill-ins" the displays are used to solve problems; pictures and maps; summaries of different points of view; expressed attitudes; case studies; self-tests; directions for projects or outside readings.
6. Questioning Strategies
    a. Questions must be addressed to students in the field by name as well as in-class students.
    b. Questions need to be pre-planned before class and sequenced in such a way as to lead the student from factual recall to understanding to rule using or application, and, hopefully, through problem solving skills of analysis, synthesis and evaluation.
    c. All questions should reflect the lecture learning performance objectives.
7. Packaging a telecourse.
    a. A packaged telecourse is completely self-contained and self-directing. All materials and instructions are sent to the site facility where a small group of students will take the course.
    b. The instructor of record may make several on-site visitations or use a telephone conferencing system at pre-determined times.

8. Consumer Assessment

a. The consumer is typically a business, industry, or military group that has contracted for telecourses because of travel time. They usually pay tuition plus a delivery fee and all associated administrative costs. Whether we like it or not these contracting groups will evaluate our telecourses for quality of teaching, overall effectiveness, interests of the student employees and total dollars spent for the purpose of a continued contractual relationship.

b. Telecourse instructors need to be aware of some of the other criteria which telecourse contractors will use and could include:

   1. Presentation and appearance
   2. Motivational factors
   3. Ease of use of Study Guides (if used)
   4. Logistics and program administration
   5. Degree of self-direction and self-pacing (if packaged)
   6. Make-up and lecture review sessions view videotape
   7. Purchase/lease plan
   8. Availability of the instructor via telephone
   9. Technical quality
   10. Use of visuals
   11. Content relevancy and update

These eight teaching factors differentiate teleclass teaching from traditional teaching. Although some may not be totally different than, they are certainly more critical to the teleclass programs.

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Session Title: The Application of an Audio Computer-graphics System to Distance Education in A Baccalaureate Nursing Program

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Content Abstract:

Methods and content of a faculty training program for an audio computer-graphics distance learning system in a baccalaureate nursing curriculum will be discussed. Teaching approaches and learner support will focus on a major clinical course in the nursing program. Teaching approaches will incorporate the concepts of "humanizing", "participation", "message style" and "feedback". Considerations relative to 1) teaching courses from an existing professional program, 2) using a large number of faculty and 3) relating to on-site and distant-site students simultaneously will be included. Preliminary studies to evaluate 1) student achievement of course objectives, 2) student perception of achievement of course objectives and 3) student satisfaction with the course will be discussed. Initial findings indicate similarities and some unexpected differences between the two student groups. Possible reasons for these differences will be suggested. Interventions for maximizing the positive characteristics and minimizing the negative ones will be explored.

The Application of an Audio Computer-graphics System to Distance Education in a Baccalaureate Nursing Program

In 1986 the University of Wisconsin-Eau Claire School of Nursing and Saint Joseph's Hospital in Marshfield, Wisconsin, entered into an agreement to establish a Satellite Nursing Program which would attempt to meet central Wisconsin's need for baccalaureate prepared nurses. During their junior year students in the program begin the core clinical courses of the nursing curriculum. Since September of 1988 the theory portions of these courses have been taught using a Videophone-targa system.

During the 1988-89 academic year twenty-one instructors adapted their teaching styles to a distant learning environment. One hundred and thirty-one lecture hours were prepared, produced, transmitted, and delivered. Faculty were oriented in groups and individually before they lectured for the first time over the system. They also attended two faculty development seminars which featured nationally known experts in distant learning.

Topics covered during faculty orientations included:

1. Characteristics of a half-duplex audio communications system
2. Commands on the graphics tablet
3. Principles of visual communications
    a) Shape of screen
    b) Amount of information
    c) Legibility
    d) Contrast
4. Auditory criteria for effective teleconferencing
    a) Natural delivery
    b) Variety
    c) Short segments

d) Preview - present - review

e) Involvement

5. Problems/concerns relevant to our experience in distant learning

Teaching Principles/Concepts

"the first class should be the best"

Humanizing - the personal touch
    faculty pictures and "bio"
    student pictures
    state name when responding
    classes originate from both sites

Participation - involvement and interaction
    reaching the "unseen" audience
    microphones
    designated responders
    calling on students
    sharing clinical experiences
    mental exercises/imagery

Message Style - process and presentation
    no specific formula
    plan, plan, plan... organize, organize, organize
    prep time and staff support
    use the system to its max
    non-system formats
    course workbook

Feedback - completing the loop
    student performance
    student evaluations
    faculty evaluations

THE APPLICATION OF AN AUDIO COMPUTER-GRAPHICS SYSTEM TO DISTANCE EDUCATION IN A BACCALAUREATE NURSING PROGRAM

Learner Responses

Some learner responses to the audio-computer graphics system of teaching and learning follow. At midterm during the first course taught with on-site and satellite students, an open-ended questionnaire was administered inquiring about students' likes, dislikes, wishes, and the effects on their learning. There were both similarities and differences between the on and off-campus groups. The on-campus group saw as positive input from others and better teacher organization/preparation. The off-campus group identified as "liked" the same content being presented at both sites plus the visuals on the TV monitors. They also appreciated their relatively close proximity to the educational site. Negatives centered on technical problems and the impersonal nature of the system. Both groups believed their learning had been affected by an increased need to concentrate and maintain attention. (Questionnaire return rate was 20% for the main campus and 68% for the satellite group).

The course evaluation tool provided the instrument for studying learner response at course end. This tool found statistically significant differences between the on-campus (n=55) and off-campus (n=16) groups on eleven items (57 items, total) in three of the four sections of the evaluation. These eleven items were answered more positively by the on-campus group. (The small sample size of the satellite group may limit interpretation of these findings.)

Essentially, the same students enrolled in the following semester's course. Data from that course evaluation indicate on-campus students (n=34) continue to show slightly more positive responses than do off-campus students (n=18), to items which would seem to be heavily influenced by the distant learning system.

Descriptive data collected by the same questionnaire used at midterm the previous semester indicates increasing numbers of "likes" about the system in both groups. Still very prevalent among dislikes is the impersonal nature of the instructors-student interaction. Students continue to wish for no technical problems but do describe the effect on their learning in more positive than negative terms. There are, by count, more similarities than differences in these responses between the on-campus (n=11) and off-campus (n=13) responders.

FIFTH ANNUAL CONFERENCE ON
TEACHING AT A DISTANCE
HELPING LEARNERS LEARN AT A DISTANCE

The Application of an Audio Computer-Graphics System to Distance Education in a Baccalaureate Nursing Program

Presenters: M. Bollinger, N. Danou, K. Maddox
University of Wisconsin-Eau Claire

Questionnaire responses at Midterm, Fall semester, and course-end Spring semester.

1. What I like about the system is.....

On-Campus, Fall (N=11)

7-Input from others
4-Better instructor preparation/ organization
2-Interesting/fun method
1-Visuals

On-Campus, Spring (N=15)

9-Outlines, pictures, diagrams, words on screen
4-Share experiences with off-campus students
4-New different, variety of instructors
1-Nothing

Off-Campus, Fall (N=13)

3-Same content both sites
2-Visuals on monitors
2-Avoiding travel
1-Increases concentration
1-New method

Off-Campus, Spring (N=13)

6-Outlines, pictures, diagrams, words on screen. Reviewing screen later
4-Avoiding travel
3-Same content both sites
2-Interact with on-campus students

2. What I dislike about the system is....

On-Campus, Fall (N=11)

6-Technical problems
4-Visual image (unclear)
3-Using mikes
3-Not seeing instructor
3-Lost time

On-Campus, Spring (N=15)

7-Malfunctions
6-Impersonal nature/not seeing instructor
4-Intimidated by system decreasing interaction
4-Lack faculty expertise in using
2-Lecturer moving too rapidly
1-Talking when instructor at distant site

Off-Campus, Fall (N=13)

4-Using mikes
3-Not seeing instructor
3-Difficulty concentrating
2-Technical problems

Off-Campus, Spring (N=13)

6-Impersonal nature/not seeing instructor
5-Lecturer moving too rapidly
4-Malfunctions
4-Trouble concentrating with watching screens and note taking
2-No dislikes
1-Talking when instructor at distant site

3. I wish the system would.....

On-Campus, Fall (N=11)

- 4-No technical problems
- 3-Better visuals
- 2-Sell lecture outlines
- 1-More non-script visuals
- 1-Student pictures

On-Campus, Spring (N=15)

- 3-More clarity sound and visuals
- 2-More expertly handled by faculty
- 1-See lecturer
- 1-Allow more interaction/discussion
- 1-Be discontinued

Off-Campus, Fall (N=13)

- 3-Moving pictures
- 2-No breakdowns
- 1-Student pictures
- 1-Slower screen change
- 1-Not be used

Off-Campus, Spring (N=13)

- 6-Allow two-way audio/video
- 2-Not malfunction
- 1-More clarity sound

4. The way the system is affecting my learning is.....

On-Campus, Fall (N=11)

- 4-Increased need to concentrate
- 3-Increased frustration
- 1-Increased comfort with mikes
- 1-Better organized lectures increased comprehension
- 1-Take more notes

On-Campus, Spring (N=15)

- 6-Enhanced
- 4-Positively/negatively
- 3-Distracted
- 1-No difference
- 1-Resent

Off-Campus, Fall (N=13)

- 3-Attention decreased
- 2-Different-must adjust
- 1-Increased understanding some concepts
- 1-Learn to listen without seeing
- 1-Too busy note-taking
- 1-Boring

Off-Campus, Spring (N=13)

- 8-Positively/no difference
- 3-Frustrating/distracting
- 1-Positively/negatively

ND:pb
8/7/89

PRODUCING TELECOURSES FOR ADULT DISTANT LEARNERS: A COOPERATIVE MODEL

by

Leslie Purdy
Director, Alternative Learning Systems
Coastline Community College

No matter what the goal of an educational institution in offering television-based instruction, a steady supply of courses will be needed in order to accomplish that goal. The goal may be the programming of a cable or ITFS system, or offering telecourses leading to a degree, or offering a smorgasbord of vocational, enrichment, and degree-directed courses. A supply of good-quality, well-designed, and up-to-date television courses is required to make any such program viable on a continuing basis.

So when you have a television-based distance education system, a major question is how to supply this specialized software. Do you produce it locally or acquire it from other producers -- or some combination of those two options? This presentation will look at two aspects of this challenge. First, what is the status of the current supply of television-based courses -- telecourses? Second, how has one institution approached the challenge of producing telecourses, both for its own use as well as for sharing with other educational institutions across the country?

Currently Available Telecourses

In the 1970s, the major problem facing colleges that wanted to offer telecourses was a shortage of good-quality courses. In the intervening years, that situation has changed considerably. The Telecourse Inventory, 1988, published by the Annenberg/CPB Project, reported that the quality and quantity of courses had increased greatly. The total number of courses listed in the inventory was 145; 31 of these were audio courses, leaving 114 telecourses, of which 13 were produced by institutions with funds from the Annenberg/CPB Project. Most of the 101 other courses had been produced by educational institutions with local funding, as cooperative productions with other colleges, or with grant moneys from a variety of sources. These institutions included individual and multicollege community college districts, universities, and consortia of educational institutions. It is important to know that there are few commercially produced telecourses on the market today.

The 114 telecourses in the inventory do not include all telecourses being used by colleges across the country. The inventory includes only those that are being distributed and are available to other institutions, not ones produced by a college for its own use. Moreover, the courses must be current, comprise several programs, and include related print materials to be listed in the inventory.

Does this mean that there are more than enough telecourses available? For a variety of reasons, the answer is no. First, many of the courses have a narrow focus. *The West of the Imagination* (a Western U.S. history and culture course); *Photographic Vision* (an introduction to the asthetics and technique of photography); and *Digital Electronics* are examples of good-quality courses whose use is limited because the potential for student enrollment is low. Second, the format or components of many of the courses are not always appropriate for specific institutional use. For example, the programs may not meet broadcast specifications and may be usable only on cable or ITFS systems or in a nonbroadcast cassette mode. Not all courses have appropriate print materials and testing-packages necessary for institutional adoption and implementation. Last, the courses may not adapt to local course or curriculum patterns, or may have other content problems. For example, a college which offers a one-semester, life span development course in classroom format may decide not to offer *The Growing Years*, a one-semester telecourse covering birth through adolescence. The curricula of American higher education institutions and the information needs of adult students are too diverse to be served by the 114 telecourses currently available. In fact, given the interest that adult students have shown in taking telecourses and the success colleges have had in offering the ones that are available, there continues to be a major need for new courses to be produced and older ones to be revised and maintained.

In 1988, the Instructional Telecommunications Consortium of the American Association of Community and Junior Colleges, with funding from the Annenberg/CPB Project, initiated a national survey of the needs of higher education institutions for new telecourses. The responses were clustered into the following six areas:

1. The Humanities - Art History, Literature, Foreign Languages, and Music History and Appreciation

2. Science/Mathematics - Algebra and Calculus

3. Social/Behaviorial Sciences - Child Development, Social Psychology

4. Communications - All levels of ESL and Composition

5. Health/Well-being - Parenting, Chemical Dependency, Stress Management, Nutrition

6. Pre-professional/Continuing Education - Business Communications and Other Vocational Areas

The survey did not investigate the need for telecourses in vocational/technical areas; however, this is an area of potential interest for distance learners and where there are few quality video series available.

Where will these courses come from? The Annenberg/CPB Project was funded in 1981 to use telecommunications to help serve the education needs of adult learners. The Project committed funds to the production of a broad range of telecourses; however, it was several years before the first completed courses began to appear on the market. Now, three to four courses are being finished each year and new productions are started, so the Project is helping address the problem. However, the Project's mandate does not include all subject matter areas and excludes such areas as vocational, business, and career education, and personal enrichment courses. Also, while many of the Annenberg funded courses have been important and high-quality television series, as telecourses, they had low adoption rates by colleges. Courses, such as ***The Africans***, ***The Brain***, and ***War and Peace in a Nuclear Age*** deal with significant topics, but are not structured along the outlines of existing college courses, thereby making them difficult for colleges to adopt and integrate into their curriculum. Since many telecourse students are seeking degrees, colleges need many basic general education courses, such as U.S. history, sociology, health, mathematics, and natural and physical sciences. Thus, while the Annenberg/CPB Project has helped and will continue to help supply telecourses, colleges continue to face the problem of an unpredicatable supply of courses.

One Institution's Experience

About twenty years ago, the Coast Community College District in California made a major commitment to providing adult distance education by using telecourses. The District applied for and received a license for a PBS station to serve Orange County and built a television station having two large studios and the capability for production as well as broadcasting. The chancellor, Dr. Norman Watson, had visited the British Open University and had a vision of offering a two-year version of the BOU in Southern California.

Recognizing the need for courseware, the District undertook the production of several ambitious telecourse projects. Courses in anthropology and psychology and practical courses in Yoga and sewing were produced. At the same time, other districts across the country were looking at this technology and delivery system and were also beginning ambitious production programs. These included the Miami-Dade Community College District and the Dallas County Community College District. Efforts were also made to adapt major PBS series into telecourse formats, such as the *Ascent of Man* and *Classic Theatre: The Humanities in Drama.* These early productions provided enough courseware to test the effectiveness of the new delivery system and the results were dramatic. Thousands of Coast students enrolled in telecourses and many, many thousands of students enrolled nationwide in similar types of offerings. Effectiveness studies provided evidence that students were getting good-quality education and that they liked the convenience and flexibility offered by this new delivery system.

However, the individual efforts of a few districts to produce telecourses or adapt national series were not adequate to supply a full curriculum of telecourses. A major problem was the cost of producing a telecourse that met Public Broadcasting Service broadcast specifications as well as faculty and student demand for high-quality and effective video. Project budgets ranged from $250,000 to $1 million, often not counting the *in-kind* contribution of facilities and staff. Coast and other districts found it impossible to cover the full costs of production. One solution was to develop cooperative production plans.

The cooperative system worked roughly like this. Dallas, for example, would propose to take the lead in the production of a highly needed course, such as *American Government*. They would send a proposal to several of the other producing institutions, asking if they would be interested in supporting such an effort. Contributions were also requested from large user institutions with the enticement of a lower total cost than if the college were to lease the course for five or six years' use. In effect, the financial commitment by the outside institutions became a pre-purchase charge. Supporting institutions also had the right to have a faculty advisor serve on a national course advisory committee that set the course goals, objectives, and lesson topics. Thus, the sources of funding for the production were Dallas (cash and in-kind), pre-purchase commitments, publisher grant and/or advance, and occasional grants from corporations or other sources.

Coast has followed this model in production of such popular courses as *Understanding Human Behavior*, *Faces of Culture*, and now a new telecourse, *Psychology: The Study of Human Behavior*, to be released in spring of 1990. Consider the costs and returns involved in a typical production. The total course budget is over $1 million, not including overhead costs. Of that, a little over $400,000 is raised from pre-purchase commitments and a grant received from the publisher of the textbook and study guide for the course. In addition, Coast commits up to $300,000 in cash toward the production plus approximately $300,000 in the form of in-kind contributions of staff and facilities.

What will be the life and financial return for this investment? For the partners, they will have free use of the course for approximately six years. Provided they enroll students in large enough numbers, they will recover costs from tuition or an enrollment-based funding formula.

Coast will recover its investment in this production in the following ways: (1) It will offer the course through a district college, Coastline Community College, for credit to students and thus not have to pay to acquire the course from someone else. That generates state funding to the college, which will also have to cover the cost of offering the course, including the faculty member teaching the course; and (2) Coast District markets the course nationwide through a marketing division, Coast Telecourses, to educational institutions and stations across the country. The course is also distributed internationally. The projected return from this marketing activity should cover the cost of Coast's financial contribution to the production in three to five years. The plan is designed so that at some point in the life of the course, there will be some excess revenue generated that could be used either to revise the course or provide seed money toward production of a new course.

Several of the most popular telecourses available now have been produced following this model. To work, the system depends on several variables:

1. Courses need to be ones which have high potential student enrollment.

2. The course content outline must be agreed upon in advance and be acceptable, not only for pre-purchase institutions but also to future college users.

3. Production quality has to be high enough to meet broadcast requirements and student/audience standards without exceeding a budget that, by industry standards, is extremely low. This requires production personnel experienced in producing cost-effective educational television.

For Coast, however, this system produces only one or possibly two telecourses a year; since a single 26-program telecourse requires a production timeline of 18 to 24 months. It also requires an extraordinary institutional commitment to fund-raising and planning. Other sources of funding -- state, federal, or corporate -- need to be identified to supplement this system in order to increase the number of courses (including special-interest courses) being produced nationally.

When I first subtitled this paper *a cooperative model*, it referred only to the cooperative production arrangements which have worked to complete usable and good-quality telecourses. But, the cooperation is really much broader than that. It includes the support of institutions leasing and using telecourses: their faculty provide feedback regarding how the course works, revisions needed in components, and even, on occasion, create special derivative works. For example, a Tarrant County Community College District instructor created a distance learning laboratory kit and manual for use with Coast's *Introducing Biology* telecourse, and a team of faculty from International University Consortium institutions is developing a book for a special upper division version of the *Marketing* telecourse. This kind of cooperation is mutually beneficial to the institutions, but, most important, it ultimately insures that what is delivered to students is more than a sterile packaged course. Only when colleges and their faculty adopt these courses as their own and work with them to serve student and institutional needs will these distance learning opportunities work best, and only then do distinctions between a *locally produced* and an *acquired* course disappear.

LNP/6/13/89

Toward Sustainable Improvements in Accessibility and Quality:

Stephen C. Ehrmann, Ph.D.
The Annenberg/CPB Project[1]

We all have seen innovations bloom, then wither and die. They may succeed in reaching educational goals. But if they do not also attract sufficient continuing support for their staff, support for their equipment, and support for upgrading content, then it's "lights out." *The character of a new programmatic strategy affects its chances for survival and growth.* What sorts of applications of technology to improve higher education are also most likely to survive?

ACCESSIBILITY VERSUS QUALITY?

Let's start by considering the two most basic goals for improvements: improving accessibility (who can learn) and quality (what they learn). Is one of them more likely than the other to yield sustainable innovations?

- Improve quality? Faculty often complain that they are not rewarded for improving teaching. That may be because colleges usually are not rewarded for improved teaching.[2] Not a good portent for innovations' chances of continued survival and growth.[3]
- Improve Accessibility? Increasing enrollment can bring a program money. However many observers assume that more access means watering down or thinning out resources. So attempts to improve accessibility[4] can be politically suspect and unstable.
- Improve accessibility for some and quality for all. Such an improvement would lack the political vulnerability of accessibility-at-any-price strategies, while gaining rewards due to both kinds of improvements.

Unusual though it has been, perhaps we should consider whether at least some strategies might simultaneously further both goals.

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[1] The Project's address is 1111 16th Street NW, Washington DC 20036. Telephone: 202-955-5273. Dr. Ehrmann can be reached via Bitnet at EHRMANN@UMDC. The ideas contained in this paper do not necessarily reflect the funding priorities or policies of the Annenberg/CPB Project.

[2] Shifting program content "sideways" to topics more attractive to job markets or graduate school markets – that can work to increase enrollments, gifts, research, and so on. That's not the kind of quality improvement we're talking about here, though. Here quality improvement is defined as more productive learning by students as measured against fixed goals.

[3] See, for example, Levine's analysis, *Why Innovation Fails*, for some interesting cases.

[4] Improving accessibility can also be accomplished by improving retention, and that can save money.

FOUR DIMENSIONS OF INTERACTION

We would ordinarily expect an excellent academic program to help its students engage in four types of interaction:

- * Use tools and resources to work on the open-ended problems of the field. Traditional tools and resources include pencils, novels, historical source materials, and science laboratories.
- * Conversations with others in real time. Traditional technologies[1] for supporting real-time conversations include the seminar room, the faculty office, and the dormitory corridor.
- * Time-delayed conversation. The conversation embodied in a homework assignment develops over a period of days, during which the participants take part from a variety of locations and times.
- * Study of instructive messages about the field under study. Traditional technologies for broadcasting such messages include lecture halls and textbooks (the interaction is student's internal "dialogue" about the instructive message).

An academic program could improve quality by enriching these four types of interaction. To enhance accessibility, students must also be able to engage in some (or, better yet, all) of these enriched interactions at nontraditional times, paces, and/or places.[2]

STRENGTHENING AND "LENGTHENING" THE FOUR INTERACTIONS

So the challenge facing the campus is how to use computing, video, telecommunications and/or other old and new technologies to help the student interact better, in each of these four ways, even (especially) when there is a gap of time or space between the student and the resources.

The students of greatest concern to our Project are hindered from pursuing a baccalaureate degree by lack of time, money, and/or access to specialized instructional resources. They often have full or part-time jobs. They are often beyond traditional college age. The majority are close enough to some campus to get to at least some classes, but perhaps not for full-time study, or perhaps not enough to work with others outside the specific hours of class.

For these students, the college might do well to consider three loci for study: a) the campus itself (but consider which events and facilities would be better available at nights and weekends, b) well-equipped outreach sites at businesses, schools (where teachers, high school students, and community members may want college credit), other campuses (a new wrinkle on cross-registration programs[1]), and libraries), c) homes and other sites not equipped by the college. The outreach sites are a point of special opportunity. As this paper will describe, students can be given rich opportunities for individual and small group studies if a room can be equipped with low-end computers, small software libraries, televisions and VCRs, and phone connections for voice and computer data.

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[1] "Technology" = the means for achieving a practical purpose.

[2] There is reason to suspect that time conflicts are even more of a problem than barriers of space. In this sense, the phrase "distant learner" can be misleading.

We'll work through the four types of interaction and briefly outline technologies a college might use for a wide range of courses, fleshing out the study of second year French as an example.

1. TOOLS AND RESOURCES FOR PROBLEM SOLVING

"Our campus has plenty of computers but all they're used for is word processing!" Commonly available computer software is enabling many faculty and students to fundamentally change the way they write, calculate, and manipulate data. Especially important is the student's increased ability to quickly create a draft and then learn by rethinking their work.[2] An increasing number of disciplinary research tools and distant databases can also be accessed through a low end computer with a modem. Therefore a computer can provide important scholarly resources for biology one hour, geography the next hour. Some students can use these from home, while others would need to get to an outreach site.

For our French II example, faculty often wish to teach the language as it is used in French cultures. Freed from some of the need to spend time traveling to campus, students could study, at home or at outreach sites, French television programs (perhaps video from the PICS[3,4] collection). Using a videodisc player at an outreach site, they could study PICS videodiscs (painlessly repeating a sentence as many times as they want to watch and hear it, for example) and an interactive documentary whose video was taped in a French neighborhood.[5] The French faculty also want students to learn to write French and not just speak it, so students employ word processing, perhaps using Systéme D software[6] which offers a variety of online references about the language and its usage. Using video and software at the outreach sites help learning indirectly, too: when scheduling and travel are less of an issue, there is more time to study.

---

[1] For example, a four year institution might offer courses at two year colleges, or a set of campuses might offer courses to one another's students, as the Bestnet Consortium has begun to do.

[2] See FIPSE Technology Study Group (1988) and Lewis (1989).

[3] The PICS Network of colleges, headquartered at the University of Iowa. Catalogs can be obtained by calling 1-800-373-7427.

[4] The Annenberg/CPB Project has supported PICS and several other efforts mentioned later in this article, including the MIT Athena Language Learning Project, "French in Action", ENFI, NJIT's EIES2 system, INTERMEDIA , and BioQUEST. The Project has also supported three projects in audiographic conferencing, the development of "Salsa" (a version of "Systéme D" for Spanish), and dissemination efforts by Profs. Rosenthal and Lewit at the University of the Virgin Islands.

[5] "A la decouverte d'un quartier": a videodisc and software that allows the student to explore a Paris district, making choices of where to turn at each corner, and which buildings to enter (where they can watch Parisians being interviewed about their neighborhood). Produced by the MIT Athena Language Learning Project and scheduled for release early in 1990.

[6] Developed at Cornell by James Noblitt, Donald Sola' and their colleagues, funded by IBM, and published by Heinle and Heinle.

2. CONVERSATION IN REAL-TIME

Students who are working on open-ended problems frequently need to talk with peers and experts. Students learning French (to return to our example) need to converse with one another, too. Outreach sites can be meeting places for small seminars or conversation groups. As these *Proceedings* describe, there are many technologies for supporting real-time conversation at a distance. Especially important are those with a visual dimension: the ability to point and annotate.[1]

Audiographic conferencing would allow our French students to talk and point as they react to images of France.[2] Students also need to express themselves in writing, and they can do that in a live, written conversation with people in the same room, or miles away. The technique is called Electronic Networking For Interaction (ENFI). ENFI students write their conversation to one another over a network. The live dialogue scrolls up each student's screen and is saved to disc. Perhaps its greatest value -- students see that writing is a way of making themselves understood to peers, not just an exercise to get a grade.[3]

3. TIME-DELAYED CONVERSATION

Other conversations, such as the exchange of homework, develop over a period of hours, days, or weeks. The technologies: fax, electronic mail, computer bulletin boards, computer conferencing systems (e.g. NJIT's new EIES 2 system), and shared use of hypertext.[4] Some unexpected benefits of text-based, time-delayed conferencing: greater attention to collaborative learning as students can help each other despite disparate schedules, and greater ease of communication when students and teachers have difficulties with oral English.

Prof. Karen Smith and her colleagues at the University of Arizona have had real success in teaching Spanish with this technology. Students write to one another in Spanish on a variety of topics, only some of which pertain to class. Even oral performance in class has improved, and students praise the system because of its accessibility (they can do homework day or night, from a variety of locations) and because they are really using their Spanish.[1] They also can communicate without always being self-conscious about their speed or accents. Working more slowly, they can explore new modes of expression.

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[1] See Myers (1989) and Gilcher and Johnstone (1989).

[2] At Harvard University, Dr. Marlies Mueller has been experimenting with the use of audiographic conferencing with the video from the telecourse "French in Action."

[3] For ENFI information, newsletter, and working papers, contact Prof. Trent Batson, Gallaudet University, Washington DC 20002, or call 202-651-5494.

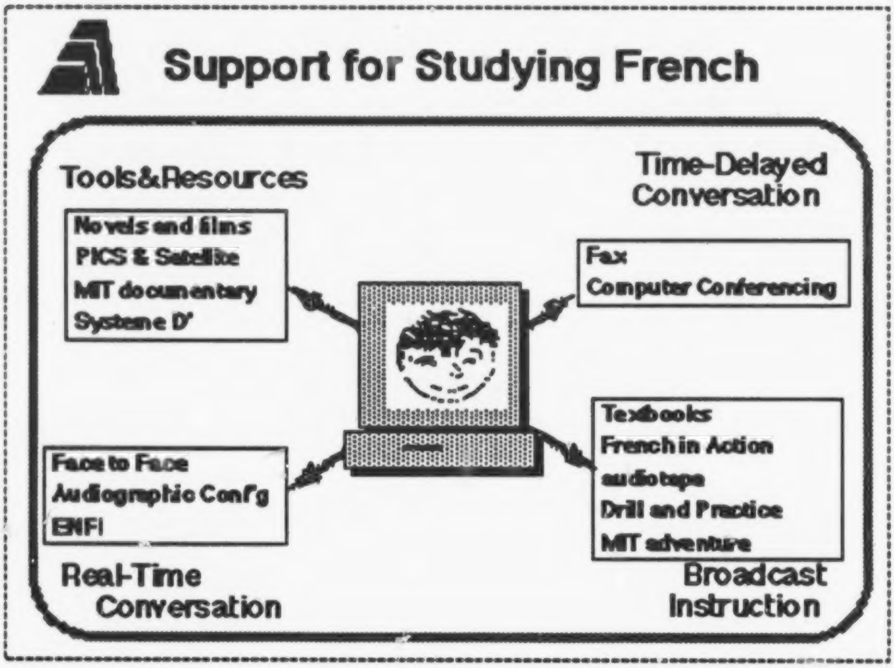
[4] Brown's new INTERMEDIA system is a multi-user system that might be used in powerful ways for studying French and France; it requires Macintosh II's running Apple's UNIX (A/UX). But even first generation hypertexts might be used as a basis for conferencing; experiments in this direction are being pursued at the University of the Virgin Islands by Profs. Lynn Rosenthal and Alan Lewit.

4. BROADCASTING INSTRUCTIVE MESSAGES FOR STUDENT STUDY

Complementing such traditional "broadcasts" such as lectures and textbooks are newer technologies including audiotape, video, and computer-aided instruction (CAI). Of particular import are new technologies for desktop publishing and presentation. Faculty are spending more time on coaching and critique, and may want to spend less time lecturing. So they "package" their lectures in pieces for students' individualized use later. At an outreach site, the student might find a collection of tapes on specific subjects which can be consulted when needed. Or the student might use a course database in order to consult written lectures on specific topics. Again, the student saves travel time and spends it on learning.

For our French example, the class might use all or part of the materials for the "French in Action" telecourse. CAI ranges from drill and practice programs to powerful simulations under development at MIT's Athena Language Learning Project to teach conversational skills, ear training, and "native" accents.

To summarize how the four types of interaction for teaching French can be strengthened:


Support for Studying French
Tools&Resources
Novels and films
PICS & Satellite
MIT documentary
Systeme D'
Time-Delayed Conversation
Fax
Computer Conferencing
Face to Face
Audiographic Conf'g
ENFI
Textbooks
French in Action
audiotape
Drill and Practice
MIT adventure
Real-Time Conversation
Broadcast Instruction

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[1] The author visited the University and interviewed students in one of the first classes to use this technology.

No one teacher would use all of these. But many could choose to improve their own styles in their own ways, meanwhile attracting new students. And the same sites could be used to teach biology, Greek classics, and English composition.

CHANGES IN CONTENT MAY BE THE KEY

"Access" has usually meant giving hitherto excluded students at least a fraction of what "normal" students already have. The new accessibility means using technologies to extend the reach of all students and faculty, and including new students in the process. The walls of the "classroom" are lowered and people can reach out as well as in: using networks to communicate with distant people and resources for example, getting students involved with internships and community projects while continuing to collaborate with peers and "attend" classes.[1]

This movement to extend the "reach" of students and faculty will pick up speed in those areas where the technology excites faculty to rethink the content of their courses. I suspect faculty will gradually emphasize coverage less, and stress more of what John Jungck and Nils Peterson have called "the three Ps": problem posing, problem-solving and persuasion. They have argued that students aren't learning a science (or any other discipline) unless they learn to pose interesting problems, make progress on them, and then persuade others that their progress has been worthwhile (Peterson and Jungck, 1988) First year students, even high school students, have learned to do research with their BioQUEST biology software. When students are given powerful tools, engaging problems, and collaborators, when they can communicate frequently and deliberately, when they can work at odd hours and in odd places, then the emphasis of the curriculum can shift from coverage to depth. And if faculty begin to rethink content, they may discover that higher enrollments and lower attrition bring additional rewards for next year's work.

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[1] There is every reason to believe that the kind of realistic problems and collaborative work supported by new technologies can be exceptionally helpful in the right kind of programs for students who have not performed well in more traditional settings. See, for example, Watkins (1989).

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